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PHOENIX AIR BASE SIMULATION USER MANUAL.(U)
JUL 81 S R SOUTHARD, C W COFFMAN

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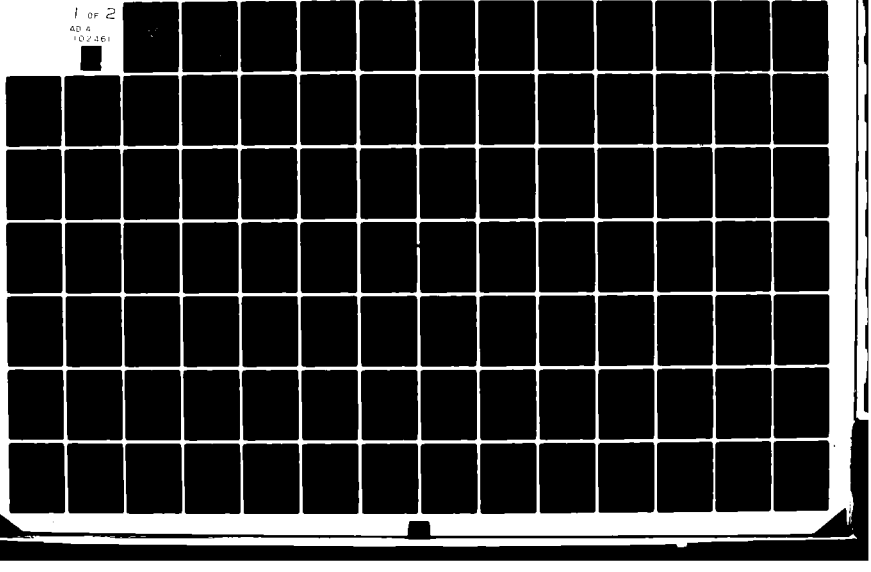

LEVEL II

(1)

PHOENIX

AIR BASE SIMULATION

USER MANUAL

JULY 1981

APPROVED FOR PUBLIC RELEASE, DISTRIBUTION UNLIMITED

JOINT STUDIES GROUP (HQ TAC)

NELLIS AIR FORCE BASE, NEVADA 89191

PHOENIX

AIR BASE SIMULATION

USER MANUAL

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JOINT STUDIES GROUP

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FOREWORD

This report describes PHOENIX, the simulation of the activities on an air base to produce sorties in accordance with an air tasking order. The effects of an air base attack on sortie generation are simulated by changing the base activities at the warning of the attack and changing resources available after the attack. The construction of the model was based primarily on operational considerations.

This report contains a detailed description of the input variables, the output reports, the sequence of events, and a sample case which can be used to verify that the program is operating properly.

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I. Introduction

A. Background. The PHOENIX computer model was developed by the US Air Force to provide a method to simulate the activities on an air base that support the generation of sorties as demanded by an air tasking order (ATO). The personnel primarily responsible for the development of the model were Ms. Sara Southard, Major Charles Coffman and Major Don Vogt of the Joint Studies Group, Nellis AFB, Nevada, and Mr. Don Heimburger and Ms. Marcia Metcalfe of CACI, Inc. - Federal, Pasadena, California. The model was designed using the Software Design and Documentation Language (SDDL), which provided a means for capturing the model data structures and algorithms in easily understood, natural language. The design was then implemented in the SIMSCRIPT II.5 structured programming language. This language was selected because of the following features:

- Automatically generated time-sequencing mechanism.
- Dynamic storage capability.
- Unrestricted, English-like, readable syntax.
- Portability over many different computers (machine independent).

The current version of the model executes on the Cyber 74 under the NOS/BE 1 operating system.

B. Purpose. The model was designed to accomplish two purposes; first, to generate sorties in accordance with a gamer-specified demand in the air tasking order and second, to depict the effects of an air base attack on the sortie generation. The model was patterned after air bases located in Central Europe and can be used to simulate the activities of either a North

Atlantic Treaty Organization (NATO) base or a Warsaw Pact (WP) base. The generic design of the model, however, does not preclude its use for simulating bases found outside Europe.

C. Model Philosophy. The sortie generation models that were examined prior to this effort were oriented toward maintenance and logistics, and it was felt that a model was needed that emphasized operations. The PHOENIX model design was operationally oriented, focusing on cycling crews, planes and producing sorties to meet the demand.

PHOENIX is an interactive, user-oriented model which prompts for all gamer-required interactions. The gamer interaction interval can be changed at any desired time.

The program was developed in a top-down manner using structured programming techniques. Each function to be performed was developed as a separate module to improve readability, maintainability and clarity. Further, the modular development facilitates the easy replacement or addition of functions.

II. Model Operations

A. General. PHOENIX is a discrete-event simulation of the activities on an air base. The key element in this type of simulation is an event, the instant in time at which an activity starts or stops. An activity is bounded by two events; for example, briefing is the activity between the START.BRIEFING[1] and START.ENGINE events. The duration of the activity is the time between the events, the briefing time, in this example. In an

FOOTNOTE 1. In this simulation, words are joined with a dot to form a multiple-word term that is read as a unit by the computer.

event, entities, the objects on a base, undergo the necessary tests and state-changes that put the activity into operation. Interactions between entities occur only at these specified points in time. Events may trigger other events, and events may be scheduled to occur at some future time.

SIMSCRIPT contains a timing routine that organizes the scheduled events so that they occur in the correct sequence and at the proper time. The timing routine also keeps track of simulated time with an artificial system clock.

Queueing is handled by means of placing the entities in a set and then removing the desired entity according to the set discipline. Most sets are processed in a first-in, first-out (FIFO) manner; however, they can be ranked in any order specified. For example, the set of resting crews is ranked by low START.CREW.REST so that the aircrews that have been resting the longest time will be selected first.

At the start of the simulation, the variables are initialized consistent with the data on the input files. All aircraft on base are considered operationally ready when the simulation begins. They are parked, serviced, and configured in accordance with the operations plan input by the user. The activities within the model are initially triggered by the arrival of the frag or air tasking order which contains the mission requirements for the day. The activities associated with supplying the sorties requested in the air tasking order will be discussed in this section categorized by those events concerned with the mission hierarchy, aircraft cycle, aircrew cycle, and air base attack. The flow of the activities is depicted in Figure 1.

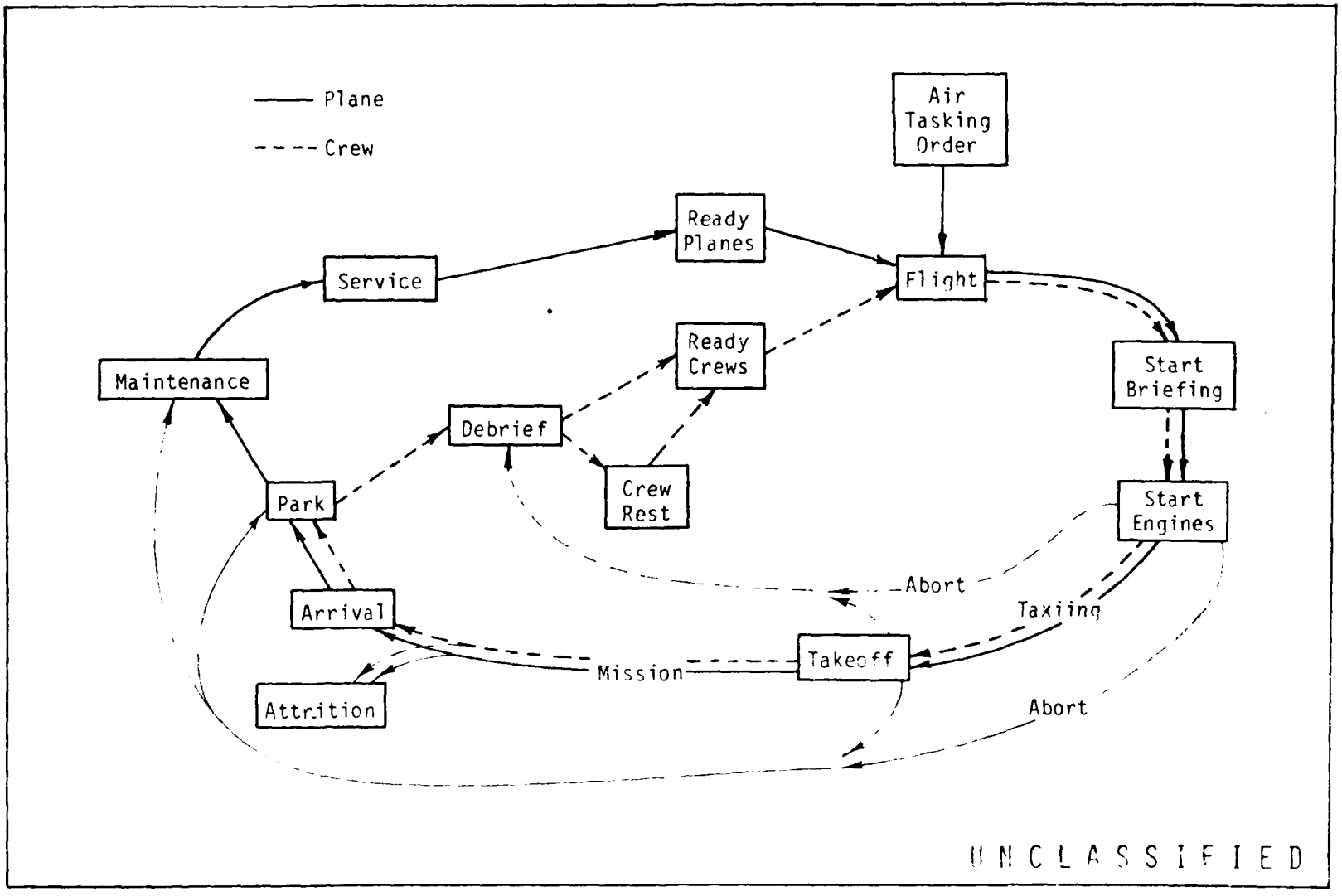

Figure 1. Air Base Activities

B. Mission Cycle Events. The nucleus of the activities in the sortie generation is the mission, which is composed of a specified number of flights. The collection of flights is a set called the gaggle. Each of the flights within a gaggle is built with a specified number of planes and crew members. The set of planes in a flight is called the formation and the set of crew members in a flight is called the flight members. Crew members include pilots and, if required, weapon systems operators (WSOs), referred to as non-pilots in the model. They are assigned to a particular plane when selected for the flight. The mission structure is shown in Figure 2.

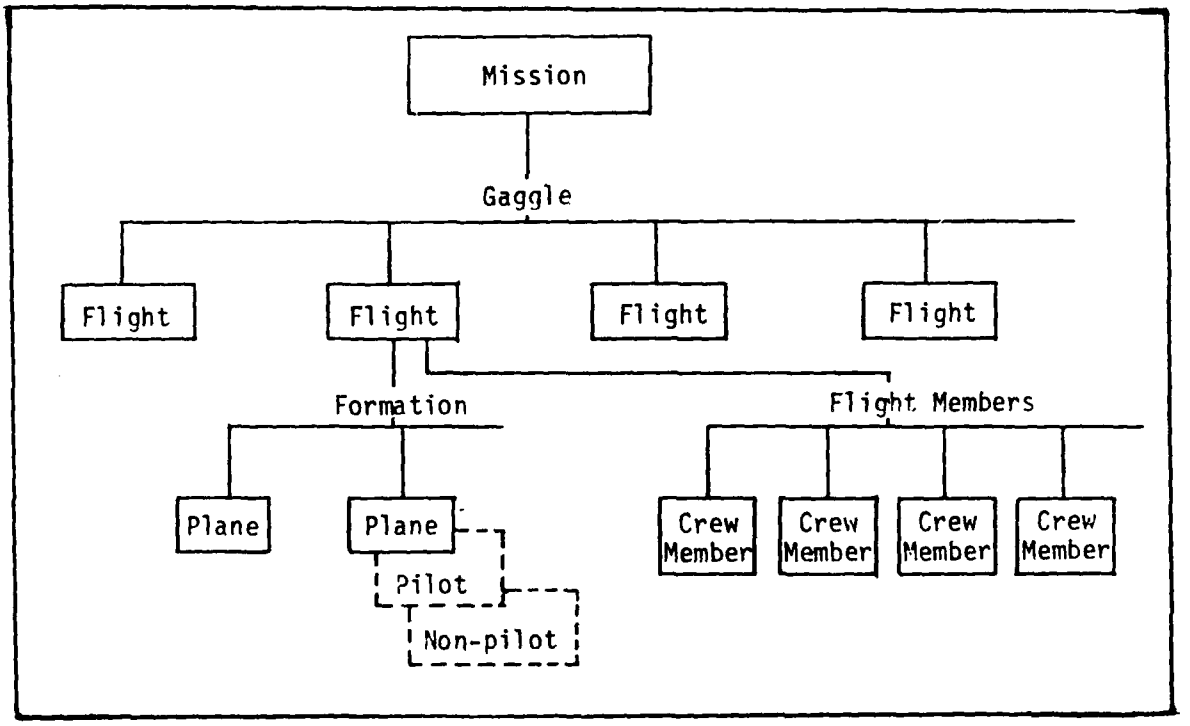

Figure 2. Mission Structure

Once a flight has been formed, the mission-related activities occur as a flight, and events such as START.ENGINE and TAKEOFF are scheduled for each flight. The flights can be members of the sets listed in Table 1.

Table 1. Sets for Flights

Set	Description
GAGGLE	Flights formed for a mission.
ARMING.AREA	Flights waiting for an available runway for takeoff.
HOLDING.PATTERN	Flights waiting for an available runway for landing.
SUSPENDED.FLIGHTS	Flights waiting to start engines after the all-clear in an attack.

A description of each of the mission-related events follows.

FRAG.ARRIVAL

The frag arrives at the specified hour with tasking for missions at varying times over target (TOT) throughout the day. Each mission is comprised of a gaggle of flights. A START.BRIEFING event is scheduled for each flight at the proper time so that the flight will meet the TOT requested.

START.BRIEFING

The START.BRIEFING event selects the planes and aircrews for the flight and starts the time for the briefing. First the planes are selected from the type specified on the frag that are loaded with the desired ordnance. If the minimum number cannot be found, the flight is aborted. The aircrews are then selected for each plane. If the number of planes in the flight is greater than one, a flight lead pilot must be chosen, and if the number is

greater than two, an element lead will also be chosen, if available. Pilots are then selected for the remaining planes in the flight. If the aircraft type is a two-seater, WSOs (identified as non-pilot in the model) are selected for each plane. The flight is aborted if qualified aircrews cannot be found for at least the minimum number of planes.

START.ENGINE

The START.ENGINE event occurs at the completion of the briefing time. A test is made to determine if there is a runway with the minimum clear length and width required for the aircraft. If one is not available at this time, the runway update time is checked, and if a runway will be clear in time to meet the TOT window, the START.ENGINE event is rescheduled at the update time; if not, the flight is aborted. If there is a clear runway, each plane is tested for a system failure, and planes with failures are aborted and removed from the flight formation. A check is made to determine if all planes can taxi from their parking places to the runway in time to meet the TOT window. Planes that cannot make the time are aborted. If the number of planes remaining in the formation are at least the minimum number required, a TAKEOFF event is scheduled.

TAKEOFF

The TAKEOFF is scheduled in the time for the flight to taxi to the runway. Since the planes take off as a flight, the longest runway access time for any plane in the flight is used. The second pre-flight test for system failure is made at the time of this event, and planes with failure are aborted. The flight is aborted if the loss of any plane drops the number in the formation of the flight below the minimum required. The takeoff

statistics are recorded, and the flight takes off if there is an unoccupied runway. If all runways are occupied, the flight is held in the arming area, and control is scheduled for the RUNWAY.ALLOCATION.DECISION event. Flights that can take off are scheduled for an arrival back at the base in the total flight time calculated for the mission.

RUNWAY.ALLOCATION.DECISION

The RUNWAY.ALLOCATION.DECISION is scheduled when a flight is in the arming area queueing for takeoff or in the holding pattern queueing for landing. The priority order is as follows:

- Flights in holding pattern that are low on fuel.
- Flights in holding pattern with a plane in an emergency condition.
- Flights in arming area that must take off immediately to meet the TOT.
- Remaining flights in the holding pattern.
- Remaining flights in the arming area.

Each decision for a takeoff records the takeoff statistics and schedules the ARRIVAL event for the flight. Each decision for a landing schedules the LANDING.COMPLETION event for the flight. The runway used is set to an occupied state for the required time to takeoff or land and then released for the next decision.

ARRIVAL

The mission activity occurs between the TAKEOFF and ARRIVAL events. The planes are not tracked throughout the missions; however, when the flights arrive over the base at the completion of the mission, each plane is checked for attrition, damage or system failure in flight. The runways are tested for the clear length and width required for landing, and if one is not clear at this time, the planes are diverted until a runway is clear. If the

weather is not suitable for aircraft operations (WØXØF) or if the weather is in instrument meteorological conditions (IMC) and the runway has no navigation aids (navaids), the flight is diverted. If the weather permits and there is an unoccupied runway with the required minimums, the landing activity commences; otherwise, the flight is diverted or placed in the holding pattern until the runway is unoccupied.

LANDING.COMPLETION

Upon landing, the pertinent data of the flight is recorded for the mission report. The planes are parked and the crews are released from the flight after the debriefing time. This event completes the mission, and planes and crews can be assigned to other flights.

WEATHER.CHANGE

WEATHER.CHANGE is an external event that changes the weather state at the time specified. It remains in that state until another time for a change in the weather state is reached in the simulation.

LOSS.RATE.CHANGE

LOSS.RATE.CHANGE is also an external event and its purpose is to change the probabilities of attrition and damage for an aircraft type at a chosen time. The initial probabilities are set when the program is initialized according to the input data and are changed only if and when this external event is referenced.

C. Aircraft Cycle Events. All planes on the base are in a set called the fleet. They are never removed from the fleet but are filed in and removed from other sets as required during the simulation. A list of the sets for planes is in Table 2.

Table 2. Sets for Planes

Set	Description
FLEET	All planes on base.
PARKED.PLANES	All planes parked on base.
FORMATION	Planes selected for a flight.
BROKEN.PLANES	Planes awaiting maintenance.
SERVICE.LINE	Planes awaiting service (fuel, ordnance).
OPEN.RANKING.SET	Planes parked in the open at the time of an air base attack warning.

A description of the events follows.

PLANE.PARKING

At the start of the simulation all planes are assigned a parking space. Assignment is made in the following priority:

- Shelter in squadron area.
- Shelter in other than squadron area.
- Revetment in squadron area.
- Revetment in other than squadron area.
- Open.

The use of a squadron area in the parking logic more closely simulates grouping aircraft for maintenance purposes. If there is a preference to sheltering planes (i.e., F-15s would be parked in shelters before F-4s) they must be loaded in the data first. Planes are not moved from their parking spaces until the event START.ENGINE occurs. If a plane is aborted after this time, it has to be reassigned to a parking space; otherwise, it remains where it is. At the completion of the flight, the planes are again allocated to a parking

place and parked according to the same initial priority. If the plane needs maintenance, the START.MAINTENANCE event is scheduled in the time for the maintenance unit to arrive at the parking place. If maintenance is not required, the START.SERVICE event is scheduled in the maximum time for either ordnance or fuel to reach the parking place.

START.MAINTENANCE

For the purpose of this model, maintenance is defined as the unscheduled repair of a plane due to combat damage or systems failure under the assumption that preventive maintenance would be suspended during the initial portion of the war. The number of planes that can be repaired simultaneously is limited to the number of maintenance units. Planes are put into a queue when the maintenance units become saturated. Planes are ranked in the queue, called the BROKEN.PLANES, so that those requiring the least repair time are pulled first.

END.OF.MAINTENANCE

The duration of the maintenance activity is the repair time of the plane. When maintenance is completed, a START.MAINTENANCE event is scheduled for the next plane in the queue. This event also schedules a START.SERVICING for planes that need service after the repair or an AIRCRAFT.READY if they already have fuel and ordnance.

START.SERVICING

The number of planes that can be serviced simultaneously is limited to the number of service units. A plane that cannot be serviced at this time is filed in the SERVICE.LINE queue.

AIRCRAFT.READY

This event terminates the service activity. The duration of the activity is

the maximum of the time to load or fuel the plane. If a plane has a ground abort because of a systems failure, the AIRCRAFT.READY is scheduled from the END.OF.MAINTENANCE event since it does not need ordnance and fuel. When a plane is ready, the service unit starts servicing the next plane in the queue.

D. Aircrew Cycle Events. The aircrews are cycled among the sets listed in Table 3. They are initialized in the set of available crews assuming that the base has been preparing for the start of a conflict. The duty day of an aircrew starts with selection for a flight in the START.BRIEFING event. The aircrew then cycles through the mission events as well as aircrew events described below.

Table 3. Sets for Aircrews

Set	Description
AVAILABLE.CREWS	Aircrews that are ready for flight selection.
RESTING.CREWS	Aircrews that are resting. (They will be selected for a flight if none are available.)
FLIGHT.MEMBERS	Aircrews that have been selected for a flight.
BRIEFING.CREWS	Aircrews that are briefing for a flight.
DEBRIEFING.CREWS	Aircrews that are debriefing after a flight.

A description of the aircrew cycle events follows.

CREW.RELEASE

This event releases the crews from the flights at the completion of the mission after crew debriefing. It also releases the crews if the assigned plane aborts. The released crew is scheduled for a RETURN.TO.AVAILABLE.CREWS

event or a RETURN.TO.CREW.REST event. The condition for RETURN.TO.CREW.REST is if the crew's duty day has expired or if the crew was awakened for the mission prior to the minimum rest time.

RETURN.TO.CREW.REST

The number of hours the crew has been on duty is accumulated each time he passes through this event and he is filed in the set of RESTING.CREWS. He is scheduled to return to the AVAILABLE.CREWS at the completion of the rest time. Optimum crew rest time is created by computing the start of crew rest time as the time he was released from his last flight.

RETURN.TO.AVAILABLE.CREWS

This event files the crew in the set of AVAILABLE CREWS. A flag is set for the crew so that his duty day begins when he is selected for a flight. The selection occurs in the START.BRIEFING event, and the set of AVAILABLE.CREWS is always searched before the set of RESTING.CREWS. Upon selection, he is scheduled to return to the set of RESTING.CREWS at the completion of his duty day. Initially all crews are in the AVAILABLE.CREW set.

E. Air Base Attack Events. The air base attack events are input by the user from the terminal and can interrupt the simulation at any time desired. The user controls the time and duration of the attack as well as the amount of warning time. A description of the events follows.

AIR.RAID.WARNING

This event is scheduled during the simulation by the gamer from the terminal in order to prepare for the on-coming attack by ceasing operations and protecting the planes. All regular runway operations, service operations, and maintenance operations are suspended. An EMERGENCY.TAKEOFF event is scheduled

for all planes in the arming area. The TAKEOFF event for the outbound taxiing planes is cancelled, and an EMERGENCY.TAKEOFF is scheduled if there is sufficient time before the expected time of attack. If there is not enough time for the takeoff, the taxiing planes are parked. The planes taxiing inbound are scheduled to be parked in emergency parking time, simulating parking in the first available shelter. The planes in the holding pattern are diverted unless they are low on fuel and must land. The planes that are parked in the open are flushed, launched for survival, if there is time to scramble the crews and takeoff. If time does not permit the planes to be flushed, or if the planes are not ready, or if qualified aircrews cannot be found, the planes are parked in shelters or revetments, if available.

EMERGENCY.TAKEOFF

The two categories of planes scheduled for an EMERGENCY.TAKEOFF are those that are fragged for a mission and takeoff early to evade an attack on the base and those that are flushed to evade the attack. The flushed planes return to the base at the ALL.CLEAR. The other planes proceed on the mission and return at the completion of the required flight time for the mission.

AIRBASE.ATTACK

This event is scheduled by the gamer from the terminal. At this time, a report is printed to show the status of all the entities on the base. Using this report to array the location of the planes, aircrews, and groundcrews on the base, attack effects may then be determined outside the model. For example, if a shelter were attacked that contained a plane and a maintenance crew, damage could be assessed on all.

ALL.CLEAR

This event is also scheduled by the gamer from the terminal. The gamer interacts with the model at this time by entering the damage results. In entering the damage assessment data, individual parking spaces, planes, crews and runways are identified as damaged. The options include:

- Parking spaces - Enter time the damaged space will become useable.
- Access times - Enter new times to access fuel, maintenance, ordnance and runway. (Damage in supply or in the route to or from the parking space can affect the times.) Enter times the access times return to normal.
- Planes - Enter repair time of a damaged plane. (Gamer is prohibited from entering damage on a plane or crew that was airborne at the time of the attack.) Any plane that is damaged so severely that the repair time is greater than the duration of the conflict is counted as an attrited plane rather than repaired.
- Crews - Enter aircrews that are attrited. (Aircrews that are wounded severely enough to prohibit them from flying for the duration of this war are considered as attrited for this simulation.)
- Maintenance units - Enter number of maintenance units attrited.
- Service units - Enter number of service units attrited.
- Runways - Enter the clear length and width of runway and time it will change. (Any number of changes can be entered.) A change to the runway designation (active or inactive) and navaids and time it will change can also be entered.

PARKING.SPACE.READY

This event is scheduled to occur in the time required to repair a damaged parking space. At this time, the parking space becomes useable.

RETURN.ACCESS.TIMES.TO.NORMAL

This event is scheduled to occur in the time required to repair damages that inhibit the access times for either fuel, maintenance, ordnance, or runway. The "normal" times are those initialized at the start of the simulation. This event can be scheduled at different times for fuel, maintenance, ordnance, or runways.

RUNWAY.UPDATE

The runway clear length and width, navaids, or designation will be updated in this event. It is scheduled to occur at the time input by the user.

III. Model Inputs

A. Data Files. The PHOENIX model was written with all data values set by the user in order to provide flexibility and to avoid obscure data in the code. The input comes from two sources: stored data files and user entries from the terminal. The stored data files contain all the data describing the air base including the physical facilities, maintenance facilities, aircraft, aircrews, and the air tasking order for the base. The data files also contain the time variables to be used in the simulation. The data entered from the terminal are in response to questions concerning changing time parameters, obtaining special status listings or scheduling an air base attack.

The data are read from the input file in free-format, which means that the order of the data entries is important, but the data itself is not restricted to specific columns or fields. The only requirement is that individual data elements must be separated by one or more blanks. Free-format relieves the user from the task of counting columns and thus eliminates input errors caused by data elements beginning in the wrong column.

Table 4 contains a list of the input data files. The data files can be stored under any identifying name but must be attached as local files using SIMU... according to the list in Table 4. EXTERNAL.FILE is the only optional input file. If it is not attached, the weather state remains visual meteorological condition (VMC) throughout the simulation and the loss rate remains at the initial rate. The other data files are required, and the program will encounter a fatal error if one is not attached.

SIMSCRIPT II.5 uses SIMU5 as the standard input unit for entries from the terminal during the gamer interaction.

Table 4. Input Data Files

Data File	File Name	Local File Name
Global variables	GLOBAL.FILE	SIMU19
Physical air base facilities	AIRBASE.FILE	SIMU7
Maintenance facilities	AIRBASE.FILE	SIMU7
Aircraft	AIRCRAFT.FILE	SIMU9
Individual planes	AIRCRAFT.FILE	SIMU9
Aircrews	AIRCRAFT.FILE	SIMU9
Operations plan	OPS.PLAN.FILE	SIMU11
Air Tasking order	FRAG.FILE	SIMU13
Weather (optional)	EXTERNAL.FILE	SIMU17
Loss rate (optional)	EXTERNAL.FILE	SIMU17

The requirements for building the data files are detailed in the Input Format Specifications for PHOENIX in Annex A. All of the variables are listed along with the mode (real, integer or alphanumeric) and the dimensions (feet, minutes, days, etc.).

1. Descriptions of Global Variables

FRAG.TIME

Time the frag or air tasking order arrives on base. The data are read from the FRAG.FILE at this hour of each day of the simulation.

BRIEF.TIME

Time crews brief for a mission plus preparation time. This is the elapsed time between the START.BRIEFING and START.ENGINES events.

DEBRIEF.TIME

Time required to debrief crews after a mission. This is the elapsed time until the crews are released from the flights after the planes in the flight have been parked.

ABORT.DEBRIEF.TIME

Time required for crews to debrief after a plane or flight is aborted. This is the elapsed time until the crew(s) are released after the aborted plane or planes in the aborted flight have been parked.

TAXI.TIME

Time required for planes to taxi from their parking places to the runway. This time is used only for planning to schedule a START.BRIEFING for the flight in order to meet the time over target. The actual time to taxi to the runway from the specific parking place is used after the planes are selected for the flight.

CREW.DUTY.DAY

Time the crew is available for flying. The crews are placed in the set of RESTING.CREWS at the completion of this time.

REQUIRED.CREW.REST

Time the crews are resting. The crews are returned to the set of AVAILABLE. CREWS at the completion of this time.

MIN.REST.TIME

Minimum resting time for crews. If crews are taken from crew rest for a flight, they are returned to the RESTING.CREWS at the completion of the flight unless they had already rested the MIN.REST.TIME.

DIVERT.TIME

Time a flight is diverted away from home base. A flight can be diverted upon arrival at home base for any of the following conditions:

- Weather is WØXØF;
- Runway has no navaids and weather is IMC;
- The flight is in the holding pattern and the base has been warned of an air base attack.

This assumes a landing at another base and then returning to the home base at the completion of the DIVERT.TIME. A diverted aircraft is counted as one sortie even though two takeoffs are assumed.

TIME.REMAINING

Time remaining before a plane will flameout upon arrival at the base. It is based on fuel reserves that a plane will carry above requirement for the mission.

VMC.LANDING.TIME

Time to land a plane in VMC.

IMC.LANDING.TIME

Time to land a plane in IMC.

EMERGENCY.TAKEOFF.TIME

Time to takeoff during the air raid warning.

EMERGENCY.PARKING.TIME

Time to park a plane during the air raid warning.

AIR.CREW.SCRAMBLE.TIME

Time for aircrews to get from the squadron operations building to the planes, start the engines and taxi during the air raid warning.

REPORT.TIME

Time of the first plane location report.

REPORT.INTERVAL

Time interval of the plane location report.

GAMER.CONTROL.INTERVAL

Time interval to interact with the program during the simulation.

END.OF.SIMULATION.TIME

Duration time of the simulation.

FACTOR.FOR.FAILURE.AT.START.ENGINE
FACTOR.FOR.FAILURE.AT.TAKEOFF
FACTOR.FOR.FAILURE.IN.FLIGHT

Factors used to compute the break rate at start engine, takeoff, or in flight. The factors must sum to one. Each major system is checked for failure at three times during a flight -- start engine, prior to takeoff (after taxiing), and upon return to the base (for a failure in flight). These factors assign a percentage of the break rate (from the AIRCRAFT.FILE) to each of these checks for failure.

RANDOM.STREAM.ATTRIT

Initiator of the random number stream in checking for attrition.

RANDOM.STREAM.DAMAGE

Initiator of the random number stream in checking for battle damage.

RANDOM.STREAM.BREAK

Initiator of the random number stream in checking for system failure.

RANDOM.STREAM.CODE.III

Initiator of the random number stream in checking for a Code III aircraft if the aircraft had battle damage or a system failure in flight. Code III failures have a landing priority.

RANDOM.STREAM.DAMAGE.REPAIR.TIME

Initiator of the random number stream in computing the repair time of a plane with battle damage.

RANDOM.STREAM.BREAK.REPAIR.TIME

Initiator of the random number stream in computing the repair time of a plane with a system failure. If a plane experienced more than one system failure and/or battle damage, the largest repair time is used, assuming simultaneous repair.

PROBABILITY.PRINT

Code to control print of all of the random numbers drawn in the detailed trace report.

2. Descriptions of Inputs for Physical Air Base Facilities

N.RUNWAY

Number of runways. A taxiway that can be used for takeoff and landing is counted as a runway.

CLEAR.LENGTH

Clear length of runway.

CLEAR.WIDTH

Clear width of runway.

CLASS

Class of runway described as either concrete or sod. The logic for the use of CLASS is not currently in the program.

DESIGNATION

Designation of runway as either active or inactive use. Only active runways are used for takeoff and landing. As result of an air base attack, the designation of a runway can be changed from inactive to active use.

NAVAIDS

Code for whether a runway has navaids. Without navaids, a plane cannot land in IMC.

N.PARKING.SPACE

Number of parking spaces.

SPOT.NUMBER

An identification number for each parking space.

TYPE

Code for the type of parking space. The following types apply: sheltered, revetted, open, or hangared. A sheltered or revetted parking space that can house two aircraft is to be counted as two separate parking spaces. One and only one space has to be identified as open and one for hangared. An unlimited number of aircraft can be parked in the open or in the hangar.

TIME.TO.ACCESS.FUEL

Time required for fuel to be transported from the fuel facility to the parking space.

TIME.TO.ACCESS.ORDNANCE

Time required for ordnance to be transported from the storage facility to the parking space.

TIME.TO.ACCESS.MAINTENANCE

Time required for maintenance personnel and equipment to reach the parking space.

TIME.TO.ACCESS.RUNWAY

Time required for aircraft to taxi from the parking space to the runway.

SQUADRON.PREFERENCE

Squadron preference for planes. Shelters and revetments that are in close proximity should maintain and service planes in the same squadron.

3. Descriptions of Inputs for Maintenance Facilities

NO.OF.MAINTENANCE.UNITS

Number of aircraft that can be repaired at any one time. The maintenance personnel work as a unit with an unspecified number of people in each unit.

NO.OF.SERVICE.UNITS

Number of aircraft that can be serviced at any one time. The service personnel work as a unit with an unspecified number of people in each unit.

4. Descriptions of Inputs for Aircraft

N.AIRCRAFT

Number of aircraft types at the base. The remaining inputs on this file are read for each aircraft type.

NAME

Name of aircraft type; for example, F-15, F-111D, FLOGGER, etc.

CREW.SIZE

Size of crew. The logic of the program currently handles only one or two.

THRU.FLIGHT.INSPECTION.TIME

Time required to inspect an aircraft after maintenance.

TIME.TO.FUEL.WITHOUT.TANKS

Time required to fuel without external tanks.

TIME.TO.FUEL.WITH.TANKS

Time required to fuel with external tanks.

ORDNANCE.LOAD.TIME

Time required to load ordnance for the mission. Input values for 4 mission types.*

AIRBORNE.TIME

Time required for the mission. It is the elapsed time between takeoff and return to the base. Input values for 4 mission types.*

PROBABILITY.OF.ATTRITION

A Monte Carlo method is used to compare the random number with this probability. Input values for 4 mission types* plus a value for the flights that are flushed during an air raid warning.

PROBABILITY.OF.DAMAGE

A Monte Carlo method is used to compare the random number with this probability. Input values for 4 mission types* plus a value for the flights that are flushed during an air raid warning.

---

*Mission types are coded as follows:
1 = offensive air support
2 = offensive counter air
3 = defensive counter air
4 = airborne interceptor/escort

PROBABILITY.OF.CODE.III

A Monte Carlo method is used to compare the random number with this probability. Only planes with damage or system failure are checked to determine if the planes are Code III. Code III planes are given landing priority.

AVERAGE.DAMAGE.REPAIR.TIME

Average time to repair a damaged aircraft. An exponential function is used with this time as the mean to determine the repair time of the aircraft.

NUMBER.OF.SYSTEMS

Number of systems that will be checked for a system failure.

BREAK.RATE

Probability that the system will break. One BREAK.RATE is read for each of the systems. A Monte Carlo method is used to compare the random number with this probability.

MEAN.TIME.TO.REPAIR

Mean time to repair a system. An exponential function is used with this time as the mean to determine the repair time of the aircraft. One MEAN.TIME.TO.REPAIR is read for each system.

MINIMUM.REPAIR.TIME

This value is used to insure that the repair time from the above function is no less than this prescribed minimum. It would preclude an unrealistically short repair time.

MAXIMUM.REPAIR.TIME

Maximum repair time that will be accomplished in the aircraft shelter or revetment. If the repair time is greater than this value, the aircraft is parked in the hangar for repairs.

MINIMUM.CLEAR.LENGTH.REQUIRED.FOR.TAKEOFF
MINIMUM.CLEAR.WIDTH.REQUIRED.FOR.TAKEOFF
MINIMUM.CLEAR.LENGTH.REQUIRED.FOR.LANDING
MINIMUM.CLEAR.WIDTH.REQUIRED.FOR.LANDING

These values are compared to the clear length and width of the runways before takeoff or landing is permitted.

5. Descriptions of Inputs for Individual Planes

N.PLANES

Number of planes. The remaining inputs on this file are read for each plane.

AIRCRAFT.TYPE

Name of aircraft type. This name must be same as NAME in the aircraft data in order to link the aircraft attributes with the individual plane.

TAIL.NUMBER

Identifying tail number of the plane.

SQUADRON

Squadron to which the plane is assigned. Priority is given to parking planes in the shelters according to the SQUADRON.PREFERENCE of the shelter.

TRACE.FLAG

Code to control print of trace on an individual plane.

6. Descriptions of Inputs for Aircrews

N.CREW.MEMBERS

Number of aircrews. The remaining inputs on this file are read for each aircrew.

QUALIFIED.AIRCRAFT

Name of aircraft type for which the aircrew is qualified. This name must be the same as NAME in the aircraft data.

CREW.NUMBER

Identifying number of the aircrew.

CREW.TYPE

The qualifications of the crew as either:

- flight lead pilot
- non-flight lead pilot
- non-pilot

CREW.TRACE.FLAG

Code to control print of trace of an aircrew.

7. Descriptions of Inputs for Operations Plans

ENTRIES.IN.PLAN

Number of entries in the plan. Each entry specifies the following four items of data: AIRCRAFT.IN.PLAN, PLANES.TO.BE.LOADED, MISSION.IN.PLAN, ORDNANCE.IN.PLAN.

AIRCRAFT.IN.PLAN

Name of aircraft type. The name must be the same as the NAME in the aircraft data.

PLANES.TO.BE.LOADED

The number of planes to be loaded.

MISSION.IN.PLAN

The specified mission as either:

- offensive air support
- offensive counter air
- defensive counter air
- airborne interceptor/escort

ORDNANCE.IN.PLAN

The ordnance load for the planes as either:

- air-to-air ordnance
- air-to-ground ordnance

8. Descriptions of Inputs for the Air Tasking Order

NUMBER.OF.MISSIONS

Number of missions fragged for one day. The program cycles through each day and then returns to read the frag order at the same hour the following day.

NO.OF.FLIGHTS

Number of flights requested for the mission.

MISSION.NUMBER

An identifying number assigned to the mission.

MISSION.TYPE

The specified mission as one of the choices in the operations plan.

ADDITIONAL.TIME.DUE.TO.AIR.REFUELING

The time added to the normal airborne time (from the aircraft data) if the flights in this mission will be air refueled.

BEGIN.TOT

The desired time over target for the mission.

END.TOT

The last time over target acceptable for the mission. If flights cannot take off in time to arrive at the target in the time span between BEGIN.TOT and END.TOT, the flight will be aborted.

DESIRED.AIRCRAFT.TYPE

The aircraft type desired for the mission. It must be the same as NAME on the aircraft data.

NO.OF.PLANES

Number of planes of the DESIRED.AIRCRAFT.TYPE for the flight.

MIN.NO.OF.PLANES

Minimum number of planes for the flight. The program searches for the NO.OF.PLANES for the flight but will launch the flight if only the MIN.NO. OF.PLANES can be found.

DESIRED.ORDNANCE.LOAD

The desired ordnance load for the mission. Currently only air-to-air or air-to-ground may be specified.

CALL.SIGN

Identifying name for the flight.

9. Descriptions of Inputs for Weather

WEATHER.CHANGE

Name of external event.

DAY.HOUR.MINUTE

Time the external event, WEATHER.CHANGE, will occur. The day, hour of the day, and minute of the hour are expressed as three integers separated by blanks. The start of the simulation is 0 0 0.

BASE.WEATHER

Weather condition expressed as either VMC, IMC, or WØXØF. The weather condition is used to determine if the flight is diverted or the time to land for the flight if it is not diverted.

BASE.WEATHER = VMC, time to land = VMC.LANDING.TIME

BASE.WEATHER = IMC and NAVAIDS = on, time to land = IMC.LANDING.TIME multiplied by the number of planes in the flight.

BASE.WEATHER = IMC and NAVAIDS = off, flight is diverted.

BASE.WEATHER = WØXØF, flight is diverted

*

Character to mark the end of data for the WEATHER.CHANGE. Any number of WEATHER.CHANGEs can be used with these four data inputs for each one.

10. Descriptions of Inputs for Loss Rate

LOSS.RATE.CHANGE

Name of the external event.

DAY.HOUR.MINUTE

Time the external event, LOSS.RATE.CHANGE will occur. The day, hour of the day, and minute of the hour are expressed as three integers separated by blanks. The start of the simulation is 0 0 0.

AIRCRAFT.NAME

Name of aircraft type; for example, F-15, F-111D, Flogger, etc.

PROBABILITY.OF.ATTRITION

Same as probability described in *Inputs for Aircraft*. These values replace the previous values at the specified time.

PROBABILITY.OF.DAMAGE

Same as probability described in Inputs for Aircraft. These values replace the previous values at the specified time.

*

Character to mark the end of the data for LOSS.RATE.CHANGE. Any number of LOSS.RATE.CHANGEs can be made and must be in chronological order on the same file with the WEATHER.CHANGEs.

B. Sample Data. A sample of all the input files is contained in Annex B. This sample should facilitate understanding the model and can serve as a test case for execution on another computer.

IV. Gamer Interactions

A. Title. The first gamer interaction is to enter an identifying title that will appear on all of the output files. The title is read in alpha format and can be any combination of up to 80 characters.

B. Changeable Data. The interactions of this model were designed for the ease of the user. The program is forgiving in that an unacceptable input does not cause a terminal error, but rather, the gamer is offered another opportunity to enter data. The interval for interactions is set by the gamer in the GAMER.CONTROL.INTERVAL read from the input file. Changing this interval is one of the options available during the interaction. When the simulated time equals the GAMER.CONTROL.INTERVAL, the following list of options appears on the terminal screen:

1 = list parking space status

2 = list taxiing planes status

3 = list crew member status

4 = display current time parameters and offer changes

5 = schedule an air base attack

P = press on

The gamer presses the number of his selection, and after that option has been executed, the list appears again for the gamer to make another selection. The cycle is repeated until terminated by the gamer entering a P.

Option 1, 2, or 3 offers the gamer the opportunity to obtain listings of the parking spaces, taxiing planes, or crew members at any time selected by the GAMER.CONTROL.INTERVAL. Option 4 prints the current values of GAMER.CONTROL.INTERVAL, END.OF.SIMULATION.TIME, and REPORT.INTERVAL and accepts

any changes in them. The gamer can thus interrupt the simulation at a specified time, interact at small intervals and then reset the interaction to a long period. The REPORT.INTERVAL is the control of the time the plane location report is generated. An example of this control would be to print the report every 12 hours for two days and then to report every hour on the third day.

Option 5 prompts the gamer for the time of air base attack, the length of air raid warning, and the length of the attack. More than one attack can be scheduled. At the time of the attack, a listing is automatically made of the status of the parking spaces, taxiing planes and crew members, so there is no need for the gamer to select option 1, 2 or 3 at the same time of the attack.

C. The Air Base Attack. The air base attack can be scheduled only from the terminal during the simulation. The gamer has to specify a GAMER.CONTROL.INTERVAL at a time before the attack. When the simulated time equals the GAMER.CONTROL.INTERVAL, the gamer selects the option to schedule an air base attack. Responses are then required for the following:

- Enter the time of attack (day, hour and minute separated by a blank space)
- Enter the length of air raid warning (in minutes)
- Enter the length of the attack (in minutes)

The gamer then has to enter damage to the base after the attack. Most likely, the weaponeering would require extensive computations, and the desirable method would be to make two computer runs. First schedule the attack in order to get the detailed snapshot of the base at the time of the

attack and do not enter any damage. Then make a second computer run with the same inputs as the first one until the attack. On this second run, enter the damage as computed from any method the gamer chooses.

Changes can be made to any or all of the following:

- parking spaces
- access times
- planes
- crew members
- maintenance units
- service units
- runways

Prompts are explicit for the type of data to be entered. The order of entering damage assessments is not restricted. A parking space that is damaged is not useable until the specified time of repair. Access times to/from the parking spaces can be changed until the damage has been repaired and then they are reset to the initial times. Planes that are on base at the time of attack can be damaged and are not put back into operationally ready status until the repair in the specified time has been completed. If the repair time of a damaged plane is greater than the END.OF.SIMULATION.TIME, the plane is counted in the number of attrited planes rather than placed in queue for repair. Crew members, maintenance units, and service units can be attrited. Attrited crew members are identified by their CREW.NUMBER but the maintenance and service units are identified only by the total number of units attrited. The damage to runways can be by cratering the runways so that the clear width and length are shortened or by destroying the navigation aids.

The runway can also be changed from inactive or active as a result of the attack. In all cases of runway damage, an unlimited number of times to update the condition can be used.

D. Synonyms. When the gamer is offered a list of options, only the number of the option is needed for a response. If any other response is given or if the number is out of range, the message "response not acceptable" is displayed and the gamer is given another chance to respond.

In entering the damage data after an attack, the gamer terminates entering data on each of the options with DONE. The program also accepts simply a D. For a press on response, the program accepts either PRESS or P. The required units of measure for the data input should be clear in each of the questions asked.

Precautions are programmed to prevent the gamer from entering impossible data; for example, an air base attack time past the simulated time, a plane damaged that is airborne at the time of the attack, or a damaged parking space that does not exist. Whenever the input is not accepted, a message is displayed for the gamer that the response was not accepted and the question is repeated.

V. Model Outputs

A. General. The output reports that are available in the simulation, the tape used for each report, and the control for generating the report are in Table 5.

Table 5. Output Data Files

Report	Tape	Control
Echo	SIMU10	Always
Mission Report	SIMU10	Always
Plane Trace Report	SIMU12	Trace flag on
Crew Member Trace Report	SIMU14	Crew trace flag on
Aircraft Daily Summary Report	SIMU16	Always
Plane Location Report	SIMU18	Report time
Parking Space Status Report	Terminal SIMU20	Gamer control Air Base Attack
Crew Member Status Report	Terminal SIMU20	Gamer control Air Base Attack
Taxiing Planes Status	Terminal SIMU20	Gamer control Air Base Attack
Maintenance Units Status Report	SIMU20	Air Base Attack
Service Units Status Report	SIMU20	Air Base Attack
Runway Status Report	SIMU20	Air Base Attack
Detailed Trace	Output	Always

The program uses SIMU8 for output to the terminal during the simulation. It is helpful if the gamer uses a terminal with a printer to have a hard copy record of interactions. A sample of all the reports is contained in Annex B. A copy of the gamer interactions is also included.

1. Echo. This report is an echo of the inputs and includes a complete list of all the input variables. The data are listed in an easy to read format with appropriate headings. This listing of the input data should facilitate interpretation of the simulation.

2. Mission report. The mission report provides a history of each flight. It contains the mission number, requested time over target, and aircraft type. The report is arranged in the chronological order according to the time the flight was terminated -- either landed or aborted. The day and hour of the report is printed on the first line with the identifying flight name or call sign. For completed flights, the report includes the tail number of all planes in the flight, the crew number of the pilot and non-pilot in each plane, and the takeoff and landing times. The flight lead plane is marked with an asterisk. A column is provided for comments on planes that are attrited or that are ground aborted after being put into the flight. A plane will be aborted for any of the following reasons.

a. Number of pilots less than number of planes. The desired number of planes is put into the formation and then pilots are found for each plane. If pilots cannot be found for all planes, the excess planes are aborted.

b. Number of non-pilots less than number of planes. If a plane requires a crew of two, the pilot is selected first and then the non-pilot is selected. If a non-pilot cannot be found for the plane, the plane is aborted.

c. Plane system failure. Each critical system on the plane is checked for a failure at start engine and again after taxiing. A failure on any system constitutes a ground abort. If the plane that has a failure is a flight lead, the comment so states.

d. Time to access runway excessive. The planes takeoff as a flight, and the time for each plane to taxi to the runway from the parked

position is checked. The flight takes off in the maximum time required for any plane in the flight to taxi to the runway. However, if the time for any plane is so long that it would cause the flight to miss the time over target, that plane is aborted.

e. Flight aborted. This message is printed for each plane in case of a flight abort after the plane had been selected for the flight.

f. Air base attack effects. A plane will be aborted due to air base attack effects if it had been selected for a flight and then damaged during the attack or if a crew member assigned to the flight was attrited.

Planes that are aborted are removed from the flight formation; however, the flight will still go as long as the minimum number of planes is in the flight and there is a flight lead, if required. Flights will be aborted for any of the following reasons.

a. Number of planes less than minimum required for the flight. The minimum number of planes for the flight is stated on the frag order, and if this number cannot be found, the flight is aborted.

b. No flight lead found. Pilots that are qualified as flight leads are identified by their CREW.TYPE in the input data. If a flight lead pilot is required for the flight according to the frag, the flight will be aborted if one cannot be found.

c. Number of pilots less than minimum required for the flight. If there are not enough pilots for all of the planes in the flight, the flight will go with the number of planes with pilots. However, if there are not enough pilots for the minimum number of planes, the flight is aborted.

d. Number of non-pilots less than number of planes in formation. The flight is aborted if the minimum number of planes and pilots can be found but the minimum number of non-pilots cannot be found.

e. Sympathetic: plane system failure. Whenever a plane is removed from the flight because of a system failure, a count is made of the remaining planes; and if the number is less than the minimum required, the flight is aborted.

f. Sympathetic: unable to meet takeoff time - excessive time to reach runway. Whenever a plane is removed from the flight because the time to taxi from the parked spot to the runway is too long to meet the takeoff time for the flight, a count is made of the remaining planes; and if the number is less than the minimum required for the flight, the flight is aborted. The flight is also checked for a flight lead pilot and is aborted if the plane that was removed was the only plane with a flight lead pilot.

g. Cannot takeoff in time to meet TOT. The time over target window is the time between BEGIN.TOT and END.TOT in the frag. All events up to TAKEOFF are scheduled to meet this window. If the flight is held up in the takeoff queue because all runways are occupied until it is too late to meet this window, the flight is aborted.

3. Plane trace report. The purpose of the plane trace report is to provide a daily record of the state of any plane throughout the simulation. Any or all of the planes will be traced according to the TRACE.FLAG on the input for individual planes. The report is a list of times in 4-digit hours and minutes that the plane enters any of nine states. If the plane is parked, it has a status of either "ready," "being serviced," "awaiting service,"

"in maintenance," or "awaiting maintenance." If the plane is not parked, it has a location of either "taxiing," "airborne," "diverted," or "attrited." At the start of the simulation all planes are "awaiting service." Before the simulation clock advances, the maximum number of planes that can be serviced, based on the NO.OF.SERVICE.UNITS, are put into the "being serviced" status. After the simulation starts, planes are moved from "awaiting service" to "being serviced" in the time it takes the fuel and ordnance to reach the plane providing there is a service unit available. For quick aircraft turns, loading the ordnance and fueling the planes occur simultaneously, and the status of the plane is changed to "ready" when both actions are completed. As service is completed on each plane, it bootstraps another plane into service. Only planes that are "ready," "being serviced," or "awaiting service" are selected for flights.

The plane stays in its parked place until the START.ENGINE event; then it moves to a "taxiing" location. It moves to the "airborne" location as soon as it is cleared for a runway. After the plane completes the mission, it arrives in the area of the base, and then its location can change to "diverted" due to weather or the base being under attack. If a plane was attrited any time during the mission, the time its location changes to "attrited" is at the normal arrival time back at the base. Likewise, if a plane had a critical system failure at any time during the flight, it returns to the base at the normal time and then is put into maintenance after it is parked. The status of a ground aborted aircraft is changed to "awaiting maintenance" at the time the break is discovered. The plane goes to an "in maintenance" status in the time it takes the maintenance unit to get to

the parked aircraft providing there is a maintenance unit available. The plane is serviced after the maintenance has been completed.

4. Crew member trace report. The purpose of the crew member trace report is to provide a daily record of the location of any crew throughout the simulation. Any or all of the crews will be traced according to the CREW.TRACE.FLAG on the input for aircrews. The report is a list of times in 4-digit hours and minutes that the crew enters any of the following states: "resting," "available," "briefing," "flying," "debriefing," or "attrited." At the start of simulation the trace indicates "available" since all crews are placed into the set of available crews. The trace indicates "briefing" as they are selected for flights and put into the set of briefing crews. The trace indicates "flying" upon takeoff and "debriefing" after the plane has been landed and parked. The time that crews are annotated as "attrited" is upon arrival back at the base even though attrition could have occurred at any time during the mission. The "resting" entry is made for crews when they are placed into the set of resting crews after the expiration of the duty day, which started with briefing for a flight.

The report lists the crews by crew numbers in the order of entry according to the aircraft qualification. The type of crew (flight lead, pilot, non-pilot) is also printed.

At the end of the simulation an aircrew summary is printed which contains the total number of hours each crew worked and hours rested. The flying hours are also listed and are included in the total hours worked.

5. Plane location report. This report provides the total number of planes in each state at any specified time. The time that the report is

generated is controlled by the REPORT.TIME and REPORT.INTERVAL in the global inputs. The REPORT.INTERVAL can be changed during the simulation with the gamer interactions. The number of planes in each state is accumulated by aircraft type. The states are the same as in the plane trace report: ready, being serviced, awaiting service, in maintenance, and awaiting maintenance for the parked planes and taxiing, airborne, diverted, and attrited for all others.

6. Aircraft Daily Summary Report. This report is a summary of the sorties for each day of the simulation. The statistics are broken down by aircraft type. The number of planes of each aircraft type at the beginning of the day is printed, and any attrited planes are subtracted from the total at the end of the day. The number of sorties that are scheduled is the number requested in the frag order. The number of sorties flown is the accumulated tally of sorties at the time the plane takes off. The difference between the number scheduled and flown is the number of sorties cancelled or aborted. All cancelled sorties are attributed to either operations or maintenance. An operations cancelled sortie will be caused by not being able to fill the planes in a flight with either flight lead pilot, non-flight lead pilot or non-pilot; not being able to take off in time to meet the time over target; or by air base attack effects. Maintenance cancelled sorties are caused by not being able to furnish the minimum number of planes requested for a flight.

Aborted sorties are categorized as either maintenance aborts or sympathetic aborts. A maintenance abort is caused by any plane having a system failure before takeoff. A sympathetic abort is caused by the

remaining planes in a flight aborting because the flight lead aborted or because the flight was reduced below the minimum requirements due to a plane in the flight aborting.

The numbers of aircraft that are attrited and damaged during the sorties each day are printed. The attrition and damage probabilities are data on the aircraft input file; however, due to the randomness in the simulation by generating a pseudorandom variable between 0 and 1 to compare with the input probabilities, the rates will change with variations in any input. The attrition and damage rates are printed for each day as the number attrited or damaged divided by the sorties flown.

If no aircraft are attrited during the day, the sortie rate is computed each day as the number of sorties flown divided by the number of aircraft possessed at the beginning of the day. However, if aircraft are attrited, the following formula is used to compute the sortie rate:

$$\frac{\ln\left[1 - \frac{\Delta N}{N}\right]}{\ln\left[1 - \frac{\Delta N}{S}\right]}$$

where ΔN = number of attrited aircraft
N = number of aircraft at the beginning of the day
S = number of sorties

7. Parking Space Status Report. This report is automatically written at the instant the base is under attack. In addition, it can be requested at any time during the simulation. The parking spaces are listed with the identifying number and type; sheltered, revetted, open or hangared.

The report includes the minutes to access the fuel, ordnance, maintenance, and runway from each of the parking spaces. If an aircraft is parked in the parking space at the time of the report, the tail number and type of the aircraft are listed by that parking space. If there is no aircraft in the parking space, it is tagged "empty." For all aircraft in shelters, there is a "yes" or "no" printed to point out whether they have been serviced. The last column on the report displays the status of the aircraft; i.e., "ready to go," "being serviced," "awaiting service," "in maintenance," or "awaiting maintenance."

8. Crew Members Status Report. This report is automatically written at the instant the base is under attack. In addition, it can be requested at any time during the simulation. The crews are listed by their aircraft qualification and type; i.e., "flight lead pilot," "non-flight lead pilot," or "non-pilot." The identifying number assigned to the crew is also displayed. The current status is given and will be either "available," "resting," "briefing," or"debriefing" since only the crews that are on base are listed in the report.

9. Maintenance Units Status Report. This report is written only at the instant the base is under attack. The maintenance units are listed along with the location of their assignment. The listed location will be indicated by the number of the parking space and the type; sheltered, revetted, open, or hangared. This report will be useful in weaponeering against personnel or maintenance equipment.

10. Service Units Status Report. This report is written only at the instant the base is under attack. The service units are listed along with

the location of their assignment. The listed location will be indicated by the number of the parking space and the type; sheltered, revetted, open, or hangared. Like the maintenance units status report, this report will be useful in weaponeering against ground crews that are co-located with the planes.

11. Runway Status Report. This report is written only at the instant the base is under attack. For each runway, the clear length and width are given along with the class of runway (concrete or sod), the designation (active or inactive) and navigation aids (yes or no).

B. Detailed Trace Report. In addition to the output reports that are available, a detailed trace report is written during the simulation. This trace is a time and event/routine history. Whenever an event or routine is entered in the simulation, an entry is made in the report with the time (day in decimal format and day, hour, minute format), the event title, and the entities or attributes passed to the event.

The report will always be written even if the program should incur an error and stop before completion. In the case of such an error, the report will be a useful tool in determining the cause of the error. The report will also assist one in understanding the logic and time sequencing of the simulation.

Normally, this report would not be printed, since a trace of crews and planes can be obtained in a concise format in the Crew Member Trace Report and the Plane Trace Report and a trace of the missions is in the Mission Report.

VI. Model Execution

A. General. This section contains the steps necessary to execute the model. It refers to the program and files as they exist on the CYBER 74 computer at Nellis AFB and will have to be modified for other computers.

B. Starting the Simulation. The program and data files are catalogued under the owner ID of SAPHNX. A sample of commands to attach the appropriate files, load and execute the program are in a proc (command file) named TESTRUN, which is shown in Figure 3. When the proc is referenced with a CALLX command, it will try to attach certain files and the user must be sure that these files exist and are not already attached. The files in this case are all identified with the prefix TEST as an identifier of the unclassified test case. They can be stored under any name the user desires but must be attached locally as SIMU... All of the input files are rewound in the program except SIMU17, the optional external event input file. INPUT and SIMU8 must be connected since they are the input and output devices for the terminal.

The following commands should be used to begin execution of the PHOENIX model:

```
LOGIN, JSG, ...              (enter, ID, account code)
ETL, 7777                    (extend execution time limit)
CALLX, TESTRUN, *SAPHNX      (attach files)
LGO, PL=77777                (begin execution and extend print limit)
```

C. Printing the Results. At the completion of the run, any one or all of the output files can be printed. Figure 4 contains a sample proc that combines all of the files to one tape and prints the merged files in an unclassified

listing. It would probably not be necessary to print the file OUTPUT unless there is an error during the execution and the program terminates before completion.

D. Compiling the Program. The source program is catalogued as PHOENIX under the ID of SAPHNX. Should it be necessary to change any of the code, the new lines of code are written over or added to the old lines and then the entire source program is saved as a local file called INPUT. The instruction to compile is:

SIMII5, OPT=PET, R=8.

The PET options direct the compiler to continue normal execution of the job when compilation errors are detected and to generate code necessary to produce tracebacks by source program line number in case of execution time errors. The reference map instruction (R=8) will produce local and global reference maps with line numbers.

SIMSCRIPT II.5 compiles every program as far as it possibly can under the philosophy that valuable information is gained by finding every syntax error and even with errors, the user can attempt to execute the program. When errors are encountered, informative diagnostics are printed. The source code, reference maps and error diagnostics are on the file OUTPUT. The user is cautioned in making changes to the source without a thorough understanding of the program logic and the relationships among the entities, attributes, and sets.

E. SDDL Processing. It is extremely helpful to have a source listing that has been processed through SDDL. Some of the automatic functions of the SDDL processor are listed below.

- Indentation by structure logic.
- Flow lines for accentuating structure escapes.
- Page reference numbers for calls to other events and routines.
- Module reference tree.
- Module cross reference listing.
- Cross reference listing of all variables (entities, attributes, sets and global variables).

The SDDL program on the Nellis CYBER 74 is catalogued as ABSSDDL under the ID of SACASDDL. To use the processor, save PHOENIX, the source code as a local file called SOURCE and use the following commands:

```
ATTACH, ABSSDDL, ID=SACASDDL
ABSSDDL, SIMU9=SOURCE, SIMU11=SIMU12, PARM=S
```

At the completion of the processing, the processed code is on the file SIMU10 which the user can then have printed.

```
.TESTRUN.
ATTACH, LGO, PHOENIXLGO, ID=SAPHNX.
ATTACH, SIMU7, TESTAIRBASEFILE, ID=SAPHNX.
ATTACH, SIMU9, TESTAIRCRAFTFILE, ID=SAPHNX.
ATTACH, SIMU11, TESTOPSPLANFILE, ID=SAPHNX.
ATTACH, SIMU13, TESTFRAGFILE, ID=SAPHNX.
ATTACH, SIMU17, TESTEXTERNALFILE, ID=SAPHNX.
ATTACH, SIMU19, TESTGLOBALFILE, ID=SAPHNX.
REWIND, SIMU17.
CONNECT, INPUT.
CONNECT, SIMU8.
.ENDP.
```

Figure 3. Contents of PROC TESTRUN

```
.PRINTPHOENIX.
REWIND, SIMU10.
REWIND, SIMU12.
REWIND, SIMU14.
REWIND, SIMU18.
REWIND, SIMU20.
REWIND, SIMU16.
COPYBR, SIMU10, TEMP.
COPYBR, SIMU12, TEMP.
COPYBR, SIMU14, TEMP.
COPYBR, SIMU18, TEMP.
COPYBR, SIMU20, TEMP.
COPYBR, SIMU16, TEMP.
REWIND, TEMP.
COMBINE, TEMP, MERGED, 20.
RETURN, TEMP.
REWIND, MERGED.
REFORM, MERGED, UN.
ROUTE, PRINT, TID=C, DC=PR, FID=JWFNX.
.ENDP.
```

Figure 4. Contents of PROC PRINTPHOENIX

VII. Error Handling

A. SIMSCRIPT II.5 Detected Errors. If an error occurs while executing the program, don't panic. The SIMSCRIPT II.5 system offers some help in discovering the cause of the error by printing the following:

- The appropriate execution error message.
- A traceback of the currently called subprogram.
- A summary of all the input and output units active at the time of the error.
- A summary of the dynamic storage usage.
- A summary of the simulation event chains.

The control is then transferred to the SNAP.R routine to perform post-mortem analysis. The SNAP.R routine in this program produces a listing of the attributes of each new member and each individual plane so that the user will have information from the execution run to help locate the error.

The execution error message is fairly specific in describing the error; for example, "INVALID CHARACTER IN I FORMAT DURING INPUT." Following the printing of the error message, the traceback information includes the name of the routine and the source line number in the routine that the program was attempting to execute when the error occurred. The values of the given and yielded arguments in the routine are also printed. The input-output summary contains READ.V and WRITE.V, the unit numbers of the current input and output units. It also displays all the following information on each input-output device referenced:

LFN - local file name

UNIT - unit number

MODE - recorded mode

STATUS - OPENED (referenced but no data read or written)

INPUT (last operation was READ)

OUTPUT (last operation was WRITE)

RECORD.V - number of records read or written

COLUMN.V - last column read or written

EOF.V - current value of end of file indicator

Some of the most probable errors are listed below. All of these errors can be corrected either by modifying the loading and executing instruction or by changing the input data.

- Insufficient time limit.
- Print limit exceeded on system printer.
- Real data when an integer is expected.
- Alpha data when real or integer is expected.
- Gamer response separated with commas.
- Encountering end of file marker before all data have been read.
- Name in the name field of external event data is not an external event name.

B. PHOENIX Detected Errors. In addition to the error routines built into the SIMSCRIPT II.5 system, other checks with appropriate error messages are written in the program. These failures are categorized into three types described below. In all types, the execution is terminated and a traceback as described for the SIMSCRIPT II.5 system is produced.

Type 1. If the number of planes to be loaded according to the operations plan does not equal the total number of planes on the base, one of these messages is printed:

NOT ENOUGH PLANES TO EXECUTE OPS PLAN.

PLANES NOT ALL SPECIFIED IN OPS PLAN.

Type 2. The NAME of an aircraft in the aircraft data must be precisely the same as AIRCRAFT.TYPE in the individual plane data, QUALIFIED. AIRCRAFT in the aircrew data, AIRCRAFT.IN.PLAN in the operations plan, DESIRED.AIRCRAFT.TYPE in the frag and AIRCRAFT.NAME in the loss rate change

data. If there is not an exact match, the message pinpoints the event where the error occurred; for example, "ERROR IN FRAG ARRIVAL."

Type 3. An error check of this type is scattered throughout the program to circumvent a failure in the logic whenever the FIND THE FIRST CASE instruction is used. The statement causes a search for the first value in a group of values that satisfies the required condition. If a value should be there and there is no logical alternative if it is not found, then the appropriate message is printed and the program stops.

C. What To Do. If an error occurs and the solution is not obvious, such as changing a value on an input file, the user should print and analyze all of the output files. The error messages and all of the traceback information will be on the OUTPUT file. Extensive measures have been taken to debug the program; however, there is always the chance that the data will create some combination of logic that has never been tested and another error will occur that cannot be corrected without a program modification.

If an error is encountered that is not readily correctable, now you can panic. If you need assistance, contact Ms. Sara Southard at Autovon 682-5670 or 702-732-0908.

ANNEX A: INPUT FORMAT SPECIFICATIONS FOR PHOENIX

The input specifications in this annex are contained in a file catalogued as INPUTSPEC, ID=SAPHNX. The file has been processed through SDDL to provide an easy-to-read format.

Table for Important Variables	A-1
Specification for Global Variables	A-2
Specification for Physical Airbase Facilities	A-3
Specification for Maintenance Facilities	A-4
Specification for Aircraft Data	A-5
Specification for Individual Planes	A-6
Specification for Aircrews	A-7
Specification for Operations Plan	A-8
Specification for Air Tasking Order	A-9
Specification for External Events	A-10
Module - Cross Reference Listing	A-11
Important Variables - Cross Reference Listing	A-12

```
LINE
   12 TABLE FOR IMPORTANT.VARIABLES
   13
   14        THE FOLLOWING TERMS ARE LISTED TO INCLUDE THESE ONE WORD VARIABLES IN
   15     THE CROSS-REFERENCE LISTING IN THE REAR OF THIS DOCUMENT
   16
   18     'CLASS'          'DESIGNATION'          'IMC'          'NAVAIDS'
   19     'SQUADRON'       'TYPE'                 'VMC'          'WOXIE'
   21
   22 ENDTABLE
```

```
LINE
  26  SPECIFICATION FOR GLOBAL.VARIABLES
  27
  28      ..........................................................................
  29      . FILE NAME = GLOBAL.FILE                          LOCAL FILE NAME = SIMU19 .
  30      ..........................................................................
  31
  32      FRAC.TIME                                          HOURS      REAL
  33      BRIEF.TIME                                         MINUTES    INTEGER
  34      DEBRIEF.TIME                                       MINUTES    INTEGER
  35      ADOPT.DEBRIEF.TIME                                 MINUTES    INTEGER
  36      TAXI.TIME                                          HOURS      REAL
  37      CREW.DUTY.DAY                                      HOURS      INTEGER
  38      REQUIRED.CREW.REST                                 HOURS      INTEGER
  39      MIN.REST.TIME                                      HOURS      INTEGER
  40      DIVERT.TIME                                        HOURS      REAL
  41      TIME.REMAINING                                     MINUTES    INTEGER
  42      VMC.LANDING.TIME                                   MINUTES    INTEGER
  43      IMC.LANDING.TIME                                   MINUTES    INTEGER
  44      EMERGENCY.TAKEOFF.TIME                             MINUTES    INTEGER
  45      EMERGENCY.PARKING.TIME                             MINUTES    INTEGER
  46      AIR.CREW.SCRAMBLE.TIME                             MINUTES    INTEGER
  47      REPORT.TIME                                        HOURS      INTEGER
  48      REPORT.INTERVAL                                    MINUTES    INTEGER
  49      GAMER.CONTROL.INTERVAL                             HOURS      REAL
  50      END.OF.SIMULATION.TIME                             DAYS       REAL
  51      FACTOR.FOR.FAILURE.AT.START.ENGINE                 FACTOR     REAL
  52      FACTOR.FOR.FAILURE.AT.TAKEOFF                      FACTOR     REAL
  53      FACTOR.FOR.FAILURE.IN.FLIGHT                       FACTOR     REAL
  54      RANDOM.STREAM.ATTACK                               NUMBER     INTEGER
  55      RANDOM.STREAM.DAMAGE                               NUMBER     INTEGER
  56      RANDOM.STREAM.BREAK                                NUMBER     INTEGER
  57      RANDOM.STREAM.CODE.III                             NUMBER     INTEGER
  58      RANDOM.STREAM.DAMAGE.REPAIR.TIME                   NUMBER     INTEGER
  59      RANDOM.STREAM.BREAK.REPAIR.TIME                    NUMBER     INTEGER
  60      ..........................................................................
  61      . RANDOM.STREAM... MUST BE AN INTEGER BETWEEN 1 AND 10, INCLUSIVE .
  62      ..........................................................................
  63      PROBABILITY.PRINT                                  CODE       INTEGER
  64          1 WILL PRINT ALL RANDOM NUMBER ON OUTPUT FILE
  65          0 WILL ELIMINATE THE PRINT OF ALL RANDOM NUMBER DRAWS
  66  END.SPECIFICATION
```

```
LINE
  67 SPECIFICATION FOR PHYSICAL.AIRBASE.FACILITIES
  68     ..........................................................................
  69     . FILE NAME = AIRBASE.FILE                          LOCAL FILE NAME = SIMU7 .
  70     ..........................................................................
  71
  72     FIRST
  73        N.RUNWAY      (NUMBER OF RUNWAYS)                  NUMBER     INTEGER
  74     NEXT
  75        ITERATE OVER EACH RUNWAY
  76           CLEAR.LENGTH                                    FEET       INTEGER
  77           CLEAR.WIDTH                                     FEET       INTEGER
  78           CLASS                                           CODE       INTEGER
  79              1=CONCRETE
  80              2=SOD
  81           DESIGNATION                                     CODE       INTEGER
  82              1=ACTIVE
  83              2=INACTIVE
  84           NAVAIDS                                         CODE       INTEGER
  85              1=YES
  86              2=NO
  87        END.ITERATION
  88     NEXT
  89        N.PARKING.SPACE  (NUMBER OF PARKING SPACES)        NUMBER     INTEGER
  90     NEXT
  91        ITERATE OVER EACH PARKING SPACE
  92           SPOT.NUMBER                                     NUMBER     3-DIGIT
  93           TYPE                                            CODE       INTEGER
  94              1=SHELTERED
  95              2=REVETTED
  96              3=OPEN (MUST HAVE AT LEAST ONE TYPE 3)
  97              4=HANGERED (MUST HAVE AT LEAST ONE TYPE 4)
  98           TIME.TO.ACCESS.FUEL                             MINUTES    INTEGER
  99           TIME.TO.ACCESS.ORDNANCE                         MINUTES    INTEGER
 100           TIME.TO.ACCESS.MAINTENANCE                      MINUTES    INTEGER
 101           TIME.TO.ACCESS.RUNWAY                           MINUTES    INTEGER
 102           SQUADRON.PREFERENCE (IF TYPE = 1 OR 2)          NUMBER     3-DIGIT
 103        END.ITERATION
 104     END.DATA.SECTION
 105 END.SPECIFICATION
```

```
LINE
 106 SPECIFICATION FOR MAINTENANCE.FACILITIES
 107     ..........................................................................
 108     . FILE NAME = AIRBASE.FILE                        LOCAL FILE NAME = SIM07 .
 109     . CONTINUE ON SAME FILE USED FOR AIR BASE FACILITIES                      .
 110     ..........................................................................
 111     NO.OF.MAINTENANCE.UNITS                          NUMBER     INTEGER
 112     NO.OF.SERVICE.UNITS                              NUMBER     INTEGER
 113 END.SPECIFICATION
```

```
LINE
 114 SPECIFICATION FOR AIRCRAFT.DATA
 115     ************************************************************************
 116     * FILE NAME = AIRCRAFT.FILE                    LOCAL FILE NAME = SIM09 *
 117     ************************************************************************
 118     FIRST
 119        N.AIRCRAFT  (NUMBER OF PROTOTYPE AIRCRAFT)     NUMBER     INTEGER
 120     NEXT
 121        ITERATE OVER EACH AIRCRAFT TYPE
 122           FIRST
 123              NAME                                     NAME       ALPHA
 124              CREW.SIZE                                NUMBER     INTEGER
 125              THRU.FLIGHT.INSPECTION.TIME              MINUTES    INTEGER
 126              TIME.TO.FUEL.WITH.TANKS                  MINUTES    INTEGER
 127              TIME.TO.FUEL.WITHOUT.TANKS               MINUTES    INTEGER
 128           NEXT:  ORDNANCE LOAD TIMES
 129              ITERATE OVER 4 MISSION TYPES (OAS, OCA, OCA, AI/ESC)
 130                 ORDNANCE.LOAD TIME                    MINUTES    INTEGER
 131              END.ITERATION
 132           NEXT:  AIRBORNE TIMES
 133              ITERATE OVER 4 MISSION TYPES (OAS, OCA, OCA, AI/ESC)
 134                 AIRBORNE.TIME                         MINUTES    INTEGER
 135              END.ITERATION
 136           NEXT:  PROBABILITIES OF ATTRITION
 137              ITERATE OVER 5 MISSION TYPES (OAS, OCA, OCA, AI/ESC, FLUSH)
 138                 PROBABILITY.OF.ATTRITION              PERCENT    INTEGER
 139              END.ITERATION
 140           NEXT:  PROBABILITIES OF DAMAGE
 141              ITERATE OVER 5 MISSION TYPES (OAS, OCA, OCA, AI/ESC, FLUSH)
 142                 PROBABILITY.OF.DAMAGE                 PERCENT    INTEGER
 143              END.ITERATION
 144           NEXT
 145              PROBABILITY.OF.CODE.III                  PERCENT    INTEGER
 146              AVERAGE.DAMAGE.REPAIR.TIME               MINUTES    INTEGER
 147              NUMBER.OF.SYSTEMS                        NUMBER     INTEGER
 148                    (MAJOR SYSTEMS THAT ARE CRITICAL TO FLIGHT)
 149           NEXT:  FREAK RATES
 150              ITERATE OVER EACH SYSTEM
 151                 FREAK.RATE                            PERCENT    INTEGER
 152              END.ITERATION
 153              ITERATE OVER EACH SYSTEM
 154                 MEAN.TIME.TO.REPAIR                   MINUTES    INTEGER
 155              END.ITERATION
 156           NEXT
 157              MINIMUM.REPAIR.TIME                      MINUTES    INTEGER
 158              MAXIMUM.REPAIR.TIME                      MINUTES    INTEGER
 159              MINIMUM.CLEAR.LENGTH.REQD.FOR.TAKEOFF    FEET       INTEGER
 160              MINIMUM.CLEAR.WIDTH.REQD.FOR.TAKEOFF     FEET       INTEGER
 161              MINIMUM.CLEAR.LENGTH.REQD.FOR.LANDING    FEET       INTEGER
 162              MINIMUM.CLEAR.WIDTH.REQD.FOR.LANDING     FEET       INTEGER
 163           END.DATA.SECTION
 164        END.ITERATION
 165     END.DATA.SECTION
 166 END.SPECIFICATION
```

```
LINE
 167 SPECIFICATION FOR INDIVIDUAL.PLANES
 168     ..........................................................................
 169     . FILE NAME = AIRCRAFT.FILE                    LOCAL FILE NAME = SIMU9 .
 170     . CONTINUE ON SAME FILE USED FOR AIRCRAFT DATA                         .
 171     ..........................................................................
 172     FIRST
 173        N.PLANES     (NUMBER OF PLANES)                  NUMBER     INTEGER
 174     NEXT
 175        ITERATE OVER EACH PLANE
 176           AIRCRAFT.TYPE                                 NAME       ALPHA
 177              MUST BE SAME AS "NAME" IN AIRCRAFT FILE
 178           TAIL.NUMBER                                   NUMBER     4-DIGIT
 179           SQUADRON                                      NUMBER     3-DIGIT
 180           TRACE.FLAG                                    CODE       INTEGER
 181              1 WILL PRINT TRACE OF PLANE ON SIMU12
 182              0 WILL ELIMINATE TRACE OF PLANE
 183        END.ITERATION
 184     END.DATA.SECTION
 185 END.SPECIFICATION
```

```
LINE
 186 SPECIFICATION FOR AIRCREWS
 197     ********************************************************************
 198     * FILE NAME = AIRCRAFT.FILE                    LOCAL FILE NAME = SIMU9 *
 199     * CONTINUE ON SAME FILE USED FOR INDIVIDUAL PLANE DATA                 *
 200     ********************************************************************
 201     FIRST
 202        N.CREW.MEMBERS  (NUMBER OF AIRCREWS)          NUMBER     INTEGER
 203     NEXT
 204        ITERATE OVER EACH CREW.MEMBER
 205           QUALIFIED.AIRCRAFT                         NAME       ALPHA
 206              MUST BE SAME AS "NAME" IN AIRCRAFT DATA
 207           CREW.NUMBER                                NUMBER     3-DIGIT
 208           CREW.TYPE                                  CODE       INTEGER
 209              1 = FLIGHT LEAD PILOT
 210              2 = NON-FLIGHT LEAD PILOT
 211              3 = WSO
 212           CREW.TRACE.FLAG                            CODE       INTEGER
 213              1 WILL PRINT TRACE OF CREW ON SIMU14
 214              0 WILL ELIMINATE TRACE OF CREW
 215        END.ITERATION
 216     END.DATA.SECTION
 217  END.SPECIFICATION
```

```
* SPECIFICATION FOR OPERATIONS.PLAN
    ..........................................................................
    . FILE NAME = OPS.PLAN.FILE                    LOCAL FILE NAME = SIMU11 .
    ..........................................................................
    FIRST
       ENTRIES.IN.PLAN  (NUMBER OF ENTRIES)          NUMBER     INTEGER
    NEXT
       ITERATE OVER EACH ENTRY
          AIRCRAFT.IN.PLAN                           NAME       ALPHA
             MUST BE SAME AS "NAME" IN AIRCRAFT FILE
          PLANES.TO.BE.LOADED                        NUMBER     INTEGER
          MISSION.IN.PLAN                            CODE       INTEGER
             1 = OFFENSIVE AIR SUPPORT
             2 = DEFENSIVE COUNTER AIR
             3 = OFFENSIVE COUNTER AIR
             4 = AIRBORNE INTERCEPT/ESCORT
          ORDNANCE.IN.PLAN                           CODE       INTEGER
             1 = AIR-TO-AIR ORDNANCE
             2 = AIR-TO-GROUND ORDNANCE
       END.ITERATION
    END.DATA.SECTION
    ..........................................................................
    . ALL PLANES MUST BE LOADED ACCORDING TO SOME ENTRY IN THE PLAN; I.E., .
    . ENTRIES.IN.PLAN TIMES PLANES.TO.BE.LOADED MUST EQUAL N.PLANES ON THE .
    . AIRCRAFT.FILE                                                        .
    ..........................................................................


END.SPECIFICATION
```

```
LINE
 237 SPECIFICATION FOR AIR.TASKING.ORDER
 238     ********************************************************************
 239     . FILE NAME = FRAG.FILE                          LOCAL FILE NAME = SIMU13 .
 240     ********************************************************************
 241
 242     FIRST
 243        NUMBER.OF.MISSIONS (NUMBER FOR ONE DAY)        NUMBER    INTEGER
 244     NEXT
 245        ITERATE OVER EACH MISSION
 246           NO.OF.FLIGHTS                               NUMBER    INTEGER
 247           MISSION.NUMBER                              NUMBER    INTEGER
 248           MISSION.TYPE                                CODE      INTEGER
 249              1 = OFFENSIVE AIR SUPPORT
 250              2 = OFFENSIVE COUNTER AIR
 251              3 = DEFENSIVE COUNTER AIR
 252              4 = AIRBORNE INTERCEPTOR ESCORT
 253           ADDITIONAL.TIME.DUE.TO.AIR.REFUELING        MINUTES   INTEGER
 254           BEGIN.TOT      (FIRST DAY =1)               DAY,HR,MN INTEGER
 255           END.TOT        (FIRST DAY =1)               DAY,HR,MN INTEGER
 256        END.ITERATION
 257        ITERATE OVER EACH FLIGHT
 258           DESIRED.AIRCRAFT.TYPE                       NAME      ALPHA
 259              MUST BE SAME AS "NAME" ON AIRCRAFT.FILE
 260           NO.OF.PLANES                                NUMBER    INTEGER
 261           MIN.NO.OF.PLANES                            NUMBER    INTEGER
 262           DESIRED.ORDNANCE.LOAD                       CODE      INTEGER
 263              1 = AIR-TO-AIR ORDNANCE
 264              2 = AIR-TO-GROUND ORDNANCE
 265           CALL.SIGN                                   NAME      ALPHA
 266        END.ITERATION
 267     END.DATA.SECTION
 268 END.SPECIFICATION
```

```
LINE
 269  SPECIFICATION FOR EXTERNAL.EVENTS
 270
 271  ********************************************************************
 272  * FILE NAME = EXTERNAL.FILE                    LOCAL FILE NAME = S14017 *
 273  *                                                                  *
 274  *    EVENTS IN THIS FILE SHOULD BE ENTERED IN THEIR ORDER OF       *
 275  * OCCURRANCE AND EACH EVENT MUST END WITH AN *.                    *
 276  ********************************************************************
 277
 278  FIRST WEATHER CHANGE EVENT
 279     WEATHER.CHANGE                                  NAME      ALPHA
 280  NEXT
 281     TIME OF EVENT  (FIRST DAY OF SIMULATION = 0)    DAY,HR,MN INTEGER
 282  NEXT
 283     BASE.WEATHER.DESIRED                            CODE      INTEGER
 284        1 = VMC
 285        2 = IMC
 286        3 = MIXED
 287  NEXT
 288     *
 289  END.DATA.SECTION
 290
 291  FIRST CHANGE OF ATTRITION AND DAMAGE VALUES
 292     LOSS.RATE.CHANGE                                NAME      ALPHA
 293  NEXT
 294     TIME OF EVENT (FIRST DAY OF SIMULATION = 0)     DAY,HR,MN INTEGER
 295  NEXT
 296     AIRCRAFT.NAME (SAME AS NAME ON AIRCRAFT.FILE)   NAME      ALPHA
 297  NEXT
 298     ITERATE FOR EACH MISSION (OAS, OCA, DCA, AI/ESC, FLUSH)
 299        PROBABILITY.OF.ATTRITION                     PERCENT   INTEGER
 300     END.ITERATION
 301     ITERATE FOR EACH MISSION (OAS, OCA, DCA, AI/ESC, FLUSH)
 302        PROBABILITY.OF.DAMAGE                        PERCENT   INTEGER
 303     END.ITERATION
 304  NEXT
 305     *
 306  END.DATA.SECTION
 307
 308  END.SPECIFICATION
```

MODULA
CROSS REFERENCE LISTING

IDENTIFIER	MODULE NAME	LINE NUMBERS
AIRCRAFT.DATA		
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AIRCREWS		
PAGE 7	SPECIFICATION FOR AIRCREWS	146 192
AIR.TASKING.ORDER		
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EXTERNAL.EVENTS		
PAGE 11	SPECIFICATION FOR EXTERNAL.EVENTS	263
GLOBAL.VARIABLES		
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IMPORTANT.VARIABLES		
PAGE 3	TABLE FOR IMPORTANT.VARIABLES	12
INDIVIDUAL.PLANES		
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MAINTENANCE.FACILITIES		
PAGE 5	SPECIFICATION FOR MAINTENANCE.FACILITIES	116
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PAGE 8	SPECIFICATION FOR OPERATIONS.PLAN	208
PHYSICAL.AIRBASE.FACILITIES		
PAGE 5	SPECIFICATION FOR PHYSICAL.AIRBASE.FACILITIES	67

IMPORTANT VARIABLES
CROSS REFERENCE LISTING

IDENTIFIER	MODULE NAME	LINE NUMBERS
ABORT.DEBRIEF.TIME		
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	35
ADDITIONAL.TIME.DUE.TO.AIR.REFUELING		
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AIRBORNE.TIME		
PAGE 5	SPECIFICATION FOR AIRCRAFT.DATA	134
AIRCRAFT.FILE		
PAGE 9	SPECIFICATION FOR AIR.TASKING.ORDER	259
PAGE 10	SPECIFICATION FOR EXTERNAL.EVENTS	236
AIRCRAFT.IN.PLAN		
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AIRCRAFT.NAME		
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AIRCRAFT.TYPE		
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PAGE 5	SPECIFICATION FOR AIRCRAFT.DATA	146
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PAGE 9	SPECIFICATION FOR AIR.TASKING.ORDER	265
CLASS		
PAGE 1	TABLE FOR IMPORTANT.VARIABLES	18
PAGE 3	SPECIFICATION FOR PHYSICAL.AIRBASE.FACILITIES	78
CLEAR.LENGTH		
PAGE 3	SPECIFICATION FOR PHYSICAL.AIRBASE.FACILITIES	76
CLEAR.WIDTH		
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CREW.DUTY.DAY		
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	37
CREW.NUMBER		
PAGE 7	SPECIFICATION FOR AIRCREWS	136
CREW.NUMBER		
PAGE 7	SPECIFICATION FOR AIRCREWS	137
CREW.SIZE		
PAGE 5	SPECIFICATION FOR AIRCRAFT.DATA	134
CREW.TRADE.PLAN		
PAGE 7	SPECIFICATION FOR AIRCREWS	202
CREW.TYPE		
PAGE 7	SPECIFICATION FOR AIRCREWS	148
DEBRIEF.TIME		

IMPORTANT VARIABLES
CROSS REFERENCE LISTING

IDENTIFIER	MODULE NAME	LINE NUMBERS
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	34
DECLARATION		
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PAGE 3	SPECIFICATION FOR PHYSICAL.AIRBASE.FACILITIES	81
DESIRED.AIRCRAFT.TYPE		
PAGE 4	SPECIFICATION FOR AIR.TASKING.ORDER	258
DESIRED.ORDNANCE.LOAD		
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PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	40
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PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	45
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END.TOT		
PAGE 4	SPECIFICATION FOR AIR.TASKING.ORDER	255
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PAGE 8	SPECIFICATION FOR OPERATIONS.PLAN	213
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FACTOR.FOR.FAILURE.AT.TAKEOFF		
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	52
FACTOR.FOR.FAILURE.IN.FLIGHT		
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	53
FIAV.TIME		
PAGE 2	SPECIFICATION FOR GLOBAL.VARIABLES	32
GAMER.CONTROL.INTERVAL		
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PAGE 1	TABLE FOR IMPORTANT.VARIABLES	18
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MAXIMUM.REPAIR.TIME		
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MEAN.TIME.TO.REPAIR		
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IMPORTANT VARIABLES
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```

ANNEX B: SAMPLE CASE

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INTRODUCTION

This annex contains a complete listing of the input files, gamer interactions and output files for a sample case. They are presented to give a practical application of the use of the model and a suggested format of the input data.

For this sample case, the air base attack was scheduled by the user at 1300 on Day 1 as shown in the listing of the gamer's interactions.

This sample could be used to check out the program if adapted to other computers.

AIRBASE.FILE
(SIMU7)

```
2
8000 150    1    1    1
8000 150    1    1    1
18
601       1       10       10       15       06       29
602       1       10       10       15       06       29
603       1       10       10       15       06       29
604       1       10       10       15       06       29
605       1       10       10       15       06       29
606       1       10       10       15       06       29
607       2       10       10       15       10       29
608       2       10       10       15       10       29
701       1       10       10       15       15       23
702       1       10       10       15       15       23
703       1       10       10       15       15       23
704       1       10       10       15       15       23
705       1       10       10       15       15       23
706       1       10       10       15       15       23
707       2       10       10       15       10       23
708       2       10       10       15       10       23
800       3       10       10       15       10
900       4       10       10       15       10
5      10
```

AIRCRAFT.FILE
(SIMU9)

```
2
F-4     2       20      20      10
25      25      10      15
100     120     90      120
10      10      10      10      1
10      10      10      10      1
20      720     9
05      02      02      03      02      01      02      02      03
840     180     780     900     1320    900     900     1200    1200
20      5760    4600    50      2800    50
A-10    1       10      15      10
10      14      2       10
100     120     60      90
7       7       7       7       1
7       7       7       7       1
20      720     9
05      02      02      01      03      01      01      01      04
360     120     240     240     300     180     180     120     360
20      5760    2200    50      1400    50
24
F-4     401     29      1
F-4     402     29      1
F-4     403     29      1
F-4     404     29      1
F-4     405     29      1
F-4     406     29      1
F-4     407     29      0
F-4     408     29      0
F-4     409     29      0
F-4     410     29      0
F-4     411     29      0
F-4     412     29      0
A-10    201     23      1
A-10    202     23      1
A-10    203     23      1
A-10    204     23      1
A-10    205     23      1
A-10    206     23      1
A-10    207     23      0
A-10    208     23      0
A-10    209     23      0
A-10    210     23      0
A-10    211     23      0
A-10    212     23      0
```

AIRCRAFT.FILE (Cont'd)
(SIMU9)

```
48
F-4     301     1     1
F-4     302     3     1
F-4     303     1     1
F-4     304     3     1
F-4     305     1     1
F-4     306     3     1
F-4     307     1     0
F-4     308     3     0
F-4     309     1     0
F-4     310     3     0
F-4     311     1     0
F-4     312     3     0
F-4     313     1     0
F-4     314     3     0
F-4     315     2     1
F-4     316     3     1
F-4     317     2     1
F-4     318     3     1
F-4     319     2     1
F-4     320     3     1
F-4     321     2     1
F-4     322     3     0
F-4     323     2     0
F-4     324     3     0
F-4     325     2     0
F-4     326     3     0
F-4     327     2     0
F-4     328     3     0
F-4     329     2     0
F-4     330     3     0
A-10    101     1     1
A-10    102     1     1
A-10    103     1     1
A-10    104     1     1
A-10    105     1     1
A-10    106     1     1
A-10    107     1     1
A-10    108     2     1
A-10    109     2     1
A-10    110     2     1
A-10    111     2     1
A-10    112     2     1
A-10    113     2     0
A-10    114     2     0
A-10    115     2     0
A-10    116     2     0
A-10    117     2     0
A-10    118     2     0
```

OPS.PLAN.FILE
(SIMUII)

```
2
F-4     12      2       2
A-10    12      1       1
```

FRAG.FILE
(SIMU13)

```
12
2       001     1       00
01 05 00        01 06 00
A-10    2       1       1       HOG
A-10    2       1       1       SOW

2       002     1       00
01 06 30        01 07 30
A-10    2       1       1       BACON
A-10    2       1       1       PORKY

3       003     2       00
01 07 00        01 08 00
F-4     2       2       2       RASTER
F-4     4       2       2       STARKLE
F-4     4       2       2       FARKLE

2       004     1       00
01 08 00        01 09 00
A-10    2       1       1       PIG
A-10    2       1       1       PECCARY

1       005     2       30
01 08 00        01 09 00
F-4     2       2       2       DOODAH

2       006     1       00
01 09 30        01 10 30
A-10    2       1       1       BOAR
A-10    2       1       1       HAM

2       007     1       00
01 11 00        01 12 00
A-10    2       1       1       SWINE
A-10    2       1       1       GRUNT

2       008     1       00
01 12 30        01 13 30
A-10    2       1       1       SQUEAL
A-10    2       1       1       OINK

3       009     2       00
01 13 00        01 14 00
F-4     2       2       2       FONDLE
F-4     2       2       2       GROVEL
F-4     2       2       2       SLATHER
```

```
2       010     1       00
01 14 00        01 15 00
A-10    2       1       1       RAZORBACK
A-10    2       1       1       JAVELINA

2       011     1       00
01 15 30        01 16 30
A-10    2       1       1       STY
A-10    2       1       1       COCHON

2       012     1       00
01 17 00        01 18 00
A-10    2       1       1       SHOAT
A-10    2       1       1       WARTHOG

12
2       001     1       00
02 05 00        02 06 00
A-10    2       1       1       HOG
A-10    2       1       1       SOW

2       002     1       00
02 06 30        02 07 30
A-10    2       1       1       BACON
A-10    2       1       1       PORKY

3       003     2       00
02 07 00        02 08 00
F-4     2       2       2       RASTER
F-4     4       2       2       STARKLE
F-4     4       2       2       FARKLE

2       004     1       00
02 08 00        02 09 00
A-10    2       1       1       PIG
A-10    2       1       1       PECCARY

1       005     2       30
02 08 00        02 09 00
F-4     2       2       2       DOODAH

2       006     1       00
02 09 30        02 10 30
A-10    2       1       1       BOAR
A-10    2       1       1       HAM
```

```
2       007     1       00
02 11 30        02 12 00
A-10    2       1       1       SWINE
A-10    2       1       1       GRUNT

2       008     1       00
02 12 30        02 13 30
A-10    2       1       1       SQUEAL
A-10    2       1       1       OINK

2       009     2       00
02 13 00        02 14 00
F-4     2       2       2       FONDLE
F-4     2       2       2       GROVEL
F-4     2       2       2       SLATHER

2       010     1       00
02 14 00        02 15 00
A-10    2       1       1       RAZORBACK
A-10    2       1       1       JAVELINA

2       011     1       00
02 15 30        02 16 30
A-10    2       1       1       STY
A-10    2       1       1       COCHON

2       012     1       00
02 17 00        02 18 00
A-10    2       1       1       SHOAT
A-10    2       1       1       WARTHOG
```

GLOBAL.FILE
(SIMU19)

```
01
60
30
15
30
12
12
8
4
20
1
3
5
5
10
0
30
4
2
.02
.08
.30
1 2 3 4 5 6
0
```

EXTERNAL.FILE
(SIMU17)

```
WEATHER.CHANGE 0 06 00 1 *
WEATHER.CHANGE 0 12 00 2 *
LOSS.RATE.CHANGE 0 17 00 F-4
5  5  5  5  1
5  5  5  5  1 *
WEATHER.CHANGE 1 06 00 3 *
WEATHER.CHANGE 1 17 30 1 *
LOSS.RATE.CHANGE 1 08 00 A-10
15 15 15 15 1
15 15 15 15 1 *
WEATHER.CHANGE 1 12 00 2 *
```

GAMER INTERACTIONS

```
ENTER A ONE LINE IDENTIFYING TITLE TO APPEAR ON EACH REPORT
TESTRUN, TRIAL THREE, AIR BASE ATTACK AT 1300


SIMULATED TIME (D:H:M) = 1:0:0

CHANGEABLE VARIABLES AND THEIR CURRENT VALUES ARE:
     1 = GAMER CONTROL INTERVAL      (PRESENT VALUE = 4.00 HOURS)
     2 = END OF SIMULATION TIME      (PRESENT VALUE = 2.00 DAYS)
     3 = REPORT GENERATION INTERVAL  (PRESENT VALUE =   30 MINUTES)

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
P


SIMULATED TIME (D:H:M) = 1:4:0

GAMER CONTROL OPTIONS ARE:
     1 = LIST PARKING SPACE STATUS
     2 = LIST TAXIING PLANES STATUS
     3 = LIST CREW MEMBER STATUS
     4 = DISPLAY CURRENT TIME PARAMETERS AND OFFER CHANGES
     5 = SCHEDULE AN AIRBASE ATTACK

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
4


SIMULATED TIME (D:H:M) = 1:4:0

CHANGEABLE VARIABLES AND THEIR CURRENT VALUES ARE:
     1 = GAMER CONTROL INTERVAL      (PRESENT VALUE = 4.00 HOURS)
     2 = END OF SIMULATION TIME      (PRESENT VALUE = 2.00 DAYS)
     3 = REPORT GENERATION INTERVAL  (PRESENT VALUE =   30 MINUTES)

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
1


INPUT NEW INTERVAL (HOURS)
80


SIMULATED TIME (D:H:M) = 1:4:0

CHANGEABLE VARIABLES AND THEIR CURRENT VALUES ARE:
     1 = GAMER CONTROL INTERVAL      (PRESENT VALUE = 80.00 HOURS)
     2 = END OF SIMULATION TIME      (PRESENT VALUE =  2.00 DAYS)
     3 = REPORT GENERATION INTERVAL  (PRESENT VALUE =    30 MINUTES)

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
P
```

```
SIMULATED TIME (D:H:M) = 1:4:0

GAMER CONTROL OPTIONS ARE:
     1 = LIST PARKING SPACE STATUS
     2 = LIST TAXIING PLANES STATUS
     3 = LIST CREW MEMBER STATUS
     4 = DISPLAY CURRENT TIME PARAMETERS AND OFFER CHANGES
     5 = SCHEDULE AN AIRBASE ATTACK

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
5


DAY 1, 0400 HR
ENTER THE TIME OF ATTACK (DAY, HOUR & MINUTE SEPARATED BY A BLANK SPACE)
1 13 00


ENTER THE LENGTH OF AIR RAID WARNING (IN MINUTES)
20


ENTER THE LENGTH OF THE ATTACK (IN MINUTES)
20


SIMULATED TIME (D:H:M) = 1:4:0

GAMER CONTROL OPTIONS ARE:
     1 = LIST PARKING SPACE STATUS
     2 = LIST TAXIING PLANES STATUS
     3 = LIST CREW MEMBER STATUS
     4 = DISPLAY CURRENT TIME PARAMETERS AND OFFER CHANGES
     5 = SCHEDULE AN AIRBASE ATTACK

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
P


AIR RAID WARNING!!!  DAY 1, 1240 HR
AIRBASE UNDER ATTACK AT DAY 1, 1300 HR
AIRBASE ALL CLEAR AT DAY 1, 1320 HR

DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
1
```

```
ENTER THE DAMAGED PARKING SPACE NUMBER (OR "DONE" IF THROUGH)
605


ENTER THE TIME (IN DECIMAL HOURS FROM NOW)
THIS PARKING SPACE WILL BECOME AVAILABLE
10


ENTER THE DAMAGED PARKING SPACE NUMBER (OR "DONE" IF THROUGH)
D


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
2


ENTER A PARKING SPACE NUMBER (OR "DONE" IF THROUGH)
701


ENTER THE NEW TIMES (IN MINUTES SEPARATED BY BLANKS)
TO ACCESS FUEL, MAINTENANCE, ORDNANCE AND RUNWAY FOR THIS SPACE
30 30 30 30


ENTER THE TIMES (DECIMAL HOURS SEPARATED BY BLANKS)
UNTIL TIMES TO ACCESS FUEL, MAINTENANCE, ORDNANCE AND RUNWAY
RETURN TO NORMAL
10 5 5 5


ENTER A PARKING SPACE NUMBER (OR "DONE" IF THROUGH)
D


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
3
```

```
ENTER THE TAIL  NUMBER  OF THE DAMAGED PLANE (OR "DONE" IF THROUGH)
406


ENTER THE NEW REPAIR TIME (IN DECIMAL HOURS)
24


ENTER THE TAIL NUMBER OF THE DAMAGED PLANE (OR "DONE" IF THROUGH)
D


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
4


ENTER THE CREW NUMBER OF THE ATTRITED CREW MEMBER
(OR ENTER "DONE" IF THROUGH)
107


ENTER THE CREW NUMBER OF THE ATTRITED CREW MEMBER
(OR ENTER "DONE" IF THROUGH)
D


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
5


ENTER THE NUMBER (INTEGER) OF MAINTENANCE UNITS DESTROYED
2
```

```
DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
6


ENTER THE NUMBER (INTEGER) OF SERVICE UNITS DESTROYED
5


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
7


ENTER THE NUMBER OF THE DAMAGED RUNWAY
(OR ENTER "DONE" IF THROUGH)
1


THE CURRENT CLEAR LENGTH IS 8000 AND THE CLEAR WIDTH IS 150 (FEET)
ENTER THE NEW VALUES (IN FEET) FOR CURRENT CLEAR LENGTH AND WIDTH
0 0


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
1


ENTER THE NEW VALUES (IN FEET) FOR CLEAR LENGTH AND WIDTH
TO BE SET AT THAT TIME
2000 100


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
2
```

```
ENTER THE NEW VALUES (IN FEET) FOR CLEAR LENGTH AND WIDTH
TO BE SET AT THAT TIME
2500 100


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
3


ENTER THE NEW VALUES (IN FEET) FOR CLEAR LENGTH AND WIDTH
TO BE SET AT THAT TIME
4000 150


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
4


ENTER THE NEW VALUES (IN FEET) FOR CLEAR LENGTH AND WIDTH
TO BE SET AT THAT TIME
8000 150


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
D


ENTER THE NUMBER OF THE DAMAGED RUNWAY
(OR ENTER "DONE" IF THROUGH)
2


THE CURRENT CLEAR LENGTH IS 8000 AND THE CLEAR WIDTH IS 150 (FEET)
ENTER THE NEW VALUES (IN FEET) FOR CURRENT CLEAR LENGTH AND WIDTH
0 0


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
12


ENTER THE NEW VALUES (IN FEET) FOR CLEAR LENGTH AND WIDTH
TO BE SET AT THAT TIME
8000 150


ENTER THE DECIMAL HOURS (FROM NOW) FOR A NEW CLEAR LENGTH AND WIDTH
(OR ENTER "DONE" IF THROUGH)
D
```

```
ENTER THE NUMBER OF THE DAMAGED RUNWAY
(OR ENTER "DONE" IF THROUGH)
D


ENTER THE NUMBER OF THE RUNWAY WHOSE DESIGNATION YOU WISH TO CHANGE
(OR ENTER "DONE" IF THROUGH)
2


RUNWAY 2 NOW HAS A DESIGNATION OF 2 (INACTIVE)
WILL THERE BE A LATER DESIGNATION CHANGE FOR THIS RUNWAY?
(YES OR NO)
Y


ENTER THE DECIMAL HOURS (FROM NOW) FOR THE DESIGNATION CHANGE
24


ENTER THE NUMBER OF THE RUNWAY WHOSE DESIGNATION YOU WISH TO CHANGE
(OR ENTER "DONE" IF THROUGH)
D


ENTER THE NUMBER OF THE RUNWAY WHOSE NAVAIDS YOU WISH TO CHANGE
(OR ENTER "DONE" IF THROUGH)
1


RUNWAY 1 NOW HAS NO NAVAIDS
WILL THERE BE A LATER NAVAIDS CHANGE FOR THIS RUNWAY?
(YES OR NO)
Y


ENTER THE DECIMAL HOURS (FROM NOW) FOR THE NAVAIDS CHANGE
1.5


ENTER THE NUMBER OF THE RUNWAY WHOSE NAVAIDS YOU WISH TO CHANGE
(OR ENTER "DONE" IF THROUGH)
D


DAMAGE OPTIONS INCLUDE:
     1 = PARKING SPACES
     2 = ACCESS TIMES
     3 = PLANES
     4 = CREW MEMBERS
     5 = MAINTENANCE UNITS
     6 = SERVICE UNITS
     7 = RUNWAYS

ENTER THE NUMBER OF YOUR SELECTION OR A "P" TO PRESS ON
P
```

T I M E P A R A M E T E R S

FRAG TIME	=	1.0 HOURS
BRIEF TIME	=	60 MINUTES
DEBRIEF TIME	=	30 MINUTES
ABORT DEBRIEF TIME	=	15 MINUTES
TAXI TIME	=	30 MINUTES
CREW DUTY DAY	=	12.0 HOURS
REQUIRED CREW REST	=	12.0 HOURS
MIN REST TIME	=	8.0 HOURS
DIVERT TIME	=	4.0 HOURS
TIME REMAINING	=	20 MINUTES
VMC LANDING TIME	=	1 MINUTES
IMC LANDING TIME	=	3 MINUTES
EMERGENCY TAKEOFF TIME	=	5 MINUTES
EMERGENCY PARKING TIME	=	5 MINUTES
AIR CREW SCRAMBLE TIME	=	10 MINUTES

S I M U L A T I O N C O N T R O L S

REPORT TIME	=	0. HOURS
REPORT INTERVAL	=	30 MINUTES
GAMER CONTROL INTERVAL	=	4.0 HOURS
END OF SIMULATION	=	2.0 DAYS

F A I L U R E W E I G H T I N G F A C T O R S

START ENGINE	=	.020
TAKEOFF	=	.080
IN FLIGHT	=	.900

R A N D O M N U M B E R S T R E A M S

ATTRITION	=	1
DAMAGE	=	9
SYSTEM BREAK	=	3
CODE III	=	4
DAMAGE REPAIR TIME	=	5
BREAK REPAIR TIME	=	6

PROBABILITY PRINT = 0
(1 WILL PRINT ALL RANDOM NUMBERS WHEN GENERATED IN SIMULATION)

A I R B A S E F A C I L I T I E S

R U N W A Y D A T A

RUNWAY NO	CLEAR LENGTH (IN FEET)	CLEAR WIDTH (IN FEET)	CLASS	DESIGNATION	NAVAIDS
1	8000	150	CONCRETE	ACTIVE	YES
2	8000	150	CONCRETE	ACTIVE	YES

BASE WEATHER = VMC

P A R K I N G S P A C E D A T A

(TYPE 1 = SHELTERED)
(TYPE 2 = REVETTED)
(TYPE 3 = OPEN)
(TYPE 4 = HANGARED)

SPOT NUMBER	TYPE	SQD PREF	---MINUTES TO ACCESS--- FUEL	ORD	MAINT	RUNWAY
601	1	29	10	10	15	6
602	1	29	10	10	15	6
603	1	29	10	10	15	6
604	1	29	10	10	15	6
605	1	29	10	10	15	6
606	1	29	10	10	15	6
607	2	29	10	10	15	10
608	2	29	10	10	15	10
701	1	23	10	10	15	15
702	1	23	10	10	15	15
703	1	23	10	10	15	15
704	1	23	10	10	15	15
705	1	23	10	10	15	15
706	1	23	10	10	15	15
707	2	23	10	10	15	10
708	2	23	10	10	15	10
800	3	0	10	10	15	10
900	4	0	10	10	15	10

(NORMAL ACCESS TIMES EQUAL ACCESS TIMES AT BEGINNING OF SIMULATION)

M A I N T E N A N C E F A C I L I T I E S

NUMBER OF MAINTENANCE UNITS = 5
NUMBER OF SERVICE UNITS = 10

AIRCRAFT DATA VALUES

(ALL TIMES IN MINUTES)

NAME	CREW SIZE	TIME TO FUEL WITH TANKS	TIME TO FUEL WITHOUT TANKS	THRU FLIGHT INSPECTION TIME	AVERAGE DAMAGE REPAIR TIME	MAXIMUM REPAIR TIME*	PROB OF CODE III	MIN CLEAR WIDTH TAKEOFF	MIN CLEAR WIDTH LANDING	MIN CLEAR LENGTH TAKEOFF	MIN CLEAR LENGTH LANDING
F-4	2	20	10	20	720	5760	20	50	50	4600	2800
A-10	1	15	10	10	720	5760	20	50	50	2200	1400

*IF REPAIR TIME EXCEEDS THIS MAXIMUM, PLANES ARE REPAIRED IN HANGARS

AIRCRAFT MISSION DATA

NAME	MISSION TYPE	ORDNANCE LOAD TIME (MINUTES)	AIRBORNE TIME (MINUTES)	PROB OF ATTRITION (%)	PROB OF DAMAGE (%)
F-4	OAS	25	100	10	10
	OCA	25	120	10	10
	DCA	10	90	10	10
	AI/ESC	15	120	10	10
	FLUSH			1	1
A-10	OAS	10	100	7	7
	OCA	14	120	7	7
	DCA	2	60	7	7
	AI/ESC	10	90	7	7
	FLUSH			1	1

AIRCRAFT SYSTEM RELIABILITY AND MAINTAINABILITY DATA

NAME	SYSTEM	BREAK RATE (%)	MEAN TIME TO REPAIR (MINUTES)
F-4	1	5	840
	2	2	180
	3	2	780
	4	3	900
	5	2	1320
	6	1	900
	7	2	900
	8	2	1200
	9	3	1200
A-10	1	5	360
	2	2	120
	3	2	240
	4	1	240
	5	3	300
	6	1	180
	7	1	180
	8	1	120
	9	4	360

INDIVIDUAL PLANE DATA

AIRCRAFT TYPE	TAIL NUMBER	SQUADRON	SPOT NUMBER	TRACE FLAG
F-4	401	29	601	1
F-4	402	29	602	1
F-4	403	29	603	1
F-4	404	29	604	1
F-4	405	29	605	1
F-4	406	29	606	1
F-4	407	29	701	0
F-4	408	29	702	0
F-4	409	29	703	0
F-4	410	29	704	0
F-4	411	29	705	0
F-4	412	29	706	0
A-10	201	23	707	1
A-10	202	23	708	1
A-10	203	23	607	1
A-10	204	23	608	1
A-10	205	23	800	1
A-10	206	23	800	1
A-10	207	23	800	0
A-10	208	23	800	0
A-10	209	23	800	0
A-10	210	23	800	0
A-10	211	23	800	0
A-10	212	23	800	0

TRACE FLAG = 1 WILL PRINT CHANGES IN LOCATION /STATUS

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C R E W M E M B E R D A T A

AIRCRAFT TYPE	CREW NUMBER	CREW TYPE	TRACE FLAG
F-4	301	1	1
F-4	302	3	1
F-4	303	1	1
F-4	304	3	1
F-4	305	1	1
F-4	306	3	1
F-4	307	1	0
F-4	308	3	0
F-4	309	1	0
F-4	310	3	0
F-4	311	1	0
F-4	312	3	0
F-4	313	1	0
F-4	314	3	0
F-4	315	2	1
F-4	316	3	1
F-4	317	2	1
F-4	318	3	1
F-4	319	2	1
F-4	320	3	1
F-4	321	2	1
F-4	322	3	0
F-4	323	2	0
F-4	324	3	0
F-4	325	2	0
F-4	326	3	0
F-4	327	2	0
F-4	328	3	0
F-4	329	2	0
F-4	330	3	0
A-10	101	1	1
A-10	102	1	1
A-10	103	1	1
A-10	104	1	1
A-10	105	1	1
A-10	106	1	1
A-10	107	1	1
A-10	108	2	1
A-10	109	2	1
A-10	110	2	1
A-10	111	2	1
A-10	112	2	1
A-10	113	2	0
A-10	114	2	0
A-10	115	2	0
A-10	116	2	0
A-10	117	2	0
A-10	118	2	0

TRACE FLAG = 1 WILL PRINT TIME OF ENTRY INTO EACH SET

O P E R A T I O N S P L A N

NUMBER OF PLANES	AIRCRAFT TYPE	MISSION TYPE	ORDNANCE LOAD
12	F-4	OCA	2
12	A-10	OAS	1

MISSION NUMBER 1, TOT WINDOW 0500 - 0600, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
HOG	A-10	1	2	1	100	0250
SOW	A-10	1	2	1	100	0250

MISSION NUMBER 2, TOT WINDOW 0630 - 0730, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
BACON	A-10	1	2	1	100	0420
PORKY	A-10	1	2	1	100	0420

MISSION NUMBER 3, TOT WINDOW 0700 - 0800, MISSION TYPE OCA
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
RASTER	F-4	2	2	2	120	0440
STARKLE	F-4	2	4	2	120	0440
FARKLE	F-4	2	4	2	120	0440

MISSION NUMBER 4, TOT WINDOW 0800 - 0900, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
PIG	A-10	1	2	1	100	0550
PECCARY	A-10	1	2	1	100	0550

MISSION NUMBER 5, TOT WINDOW 0800 - 0900, MISSION TYPE OCA
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 30

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
DOODAH	F-4	2	2	2	150	0525

MISSION NUMBER 6, TOT WINDOW 0930 - 1030, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
BOAR	A-10	1	2	1	100	1720
HAM	A-10	1	2	1	100	1720

MISSION NUMBER 7, TOT WINDOW 1100 - 1200, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
SWINE	A-10	1	2	1	100	0850
GRUNT	A-10	1	2	1	100	0850

MISSION NUMBER 8, TOT WINDOW 1230 - 1330, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
SQUEAL	A-10	1	2	1	100	1020
OINK	A-10	1	2	1	100	1020

MISSION NUMBER 9, TOT WINDOW 1300 - 1400, MISSION TYPE OCA
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
FONDLE	F-4	2	2	2	120	1040
GROVEL	F-4	2	2	2	120	1040
SLITHER	F-4	2	2	2	120	1040

MISSION NUMBER 10, TOT WINDOW 1400 - 1500, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
RAZORBACK	A-10	1	2	1	100	1150
JAVELINA	A-10	1	2	1	100	1150

MISSION NUMBER 11, TOT WINDOW 1530 - 1630, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
STY	A-10	1	2	1	100	1320
COCHON	A-10	1	2	1	100	1320

MISSION NUMBER 12, TOT WINDOW 1700 - 1800, MISSION TYPE OAS
ADDITIONAL TIME DUE TO AIR-TO-AIR REFUELING 0

FLIGHT ATTRIBUTES

CALL SIGN	AIRCRAFT TYPE	ORDNANCE LOAD	NUMBER PLANES	MINIMUM PLANES	FLIGHT TIME	START BRIEFING
SHOAT	A-10	1	2	1	100	1450
WARTHOG	A-10	1	2	1	100	1450

NOTE: Frag for Day 2 is not included in this manual.

TESTRUN AIR BASE ATTACK AT 1300

M I S S I O N R E P O R T

MISSION REPORT FOR HOG FLIGHT ON DAY 1, 0541 HR

MISSION NUMBER 1, TOT 0500 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
201*	101		0400	0541	
202	108		0400	0541	

MISSION REPORT FOR SOW FLIGHT ON DAY 1, 0541 HR

MISSION NUMBER 1, TOT 0500 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
203*	102		0400	0541	
204	109		0400	0541	

MISSION REPORT FOR BACON FLIGHT ON DAY 1, 0710 HR

MISSION NUMBER 2, TOT 0630 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
206	110				0530--ABORT, PLANE SYSTEM FAILURE
205*	103		0530		0710--ATTRITTED

MISSION REPORT FOR PORKY FLIGHT ON DAY 1, 0711 HR

MISSION NUMBER 2, TOT 0630 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
207*	104		0530	0711	
208	111		0530	0711	

MISSION REPORT FOR RASTER FLIGHT ON DAY 1, 0747 HR

MISSION NUMBER 3, TOT 0700 HR, AIRCRAFT TYPE F-4

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
401*	301	302	0546	0747	
402	315	304	0546		0746--ATTRITTED

MISSION REPORT FOR STARKLE FLIGHT ON DAY 1, 0747 HR

MISSION NUMBER 3, TOT 0700 HR, AIRCRAFT TYPE F-4

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
403*	303	306	0546	0747	
404*	305	308	0546	0747	
405	317	310	0546	0747	
406	319	312	0546	0747	

MISSION REPORT FOR FARKLE FLIGHT ON DAY 1, 0756 HR

MISSION NUMBER 3, TOT 0700 HR, AIRCRAFT TYPE F-4

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
408*	309	316	0555	0756	
410	323	320	0555	0756	
407*	307	314			0555--ABORT, FLIGHT LEAD SYSTEM FAILURE
409	321	318	0555		0755--ATTRITTED

MISSION REPORT FOR PIG FLIGHT ON DAY 1, 0841 HR

MISSION NUMBER 4, TOT 0900 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
209*	105		0700	0841	
210	112		0700	0841	

MISSION REPORT FOR PECCARY FLIGHT ON DAY 1, 0841 HR

MISSION NUMBER 4, TOT 0800 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
211*	106		0700	0841	
212	113		0700	0841	

MISSION REPORT FOR GRUNT FLIGHT ON DAY 1, 0850 HR

MISSION NUMBER 7, TOT 1100 HR, AIRCRAFT TYPE A-10

FLIGHT ABORTED--NUMBER OF PLANES LESS THAN MINIMUM REQUIRED FOR THE FLIGHT

MISSION REPORT FOR DOCDAH FLIGHT ON DAY 1, 0911 HR

MISSION NUMBER 5, TOT 0800 HR, AIRCRAFT TYPE F-4

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
411*	311	322	0640	0911	
412	325	324	0640	0911	

MISSION REPORT FOR BOAR FLIGHT ON DAY 1, 1015 HR

MISSION NUMBER 6, TOT 0930 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
201*	107		0835	1016	
202	114				0820--ABORT, PLANE SYSTEM FAILURE

MISSION REPORT FOR HAM FLIGHT ON DAY 1, 1015 HR

MISSION NUMBER 6, TOT 0930 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
203*	101		0835	1016	
204	115		0835	1016	

MISSION REPORT FOR SWINE FLIGHT ON DAY 1, 1146 HR

MISSION NUMBER 7, TOT 1100 HR, AIRCRAFT TYPE A-10

FLIGHT COMPLETED

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
207*	102		1005	1146	
208	116		1005	1146	

MISSION REPORT FOR RAZORBACK FLIGHT ON DAY 1, 1320 HR

MISSION NUMBER 10, TOT 1400 HR, AIRCRAFT TYPE A-10

FLIGHT ABORTED--CANNOT TAKEOFF IN TIME TO MEET TOT WINDOW

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
203*	106				1320--ABORT, FLIGHT ABORTED
211	107				1320--ABORT, FLIGHT ABORTED

MISSION REPORT FOR JAVELINA FLIGHT ON DAY 1, 1320 HR

MISSION NUMBER 10, TOT 1400 HR, AIRCRAFT TYPE A-10

FLIGHT ABORTED--CANNOT TAKEOFF IN TIME TO MEET TOT WINDOW

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
212	109				1320--ABORT, FLIGHT ABORTED

MISSION REPORT FOR STY FLIGHT ON DAY 1, 1320 HR

MISSION NUMBER 11, TOT 1530 HR, AIRCRAFT TYPE A-10

FLIGHT ABORTED--NO FLIGHT LEAD FOUND

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
203					1320--ABORT, FLIGHT ABORTED
207					1320--ABORT, FLIGHT ABORTED

MISSION REPORT FOR COCHON FLIGHT ON DAY 1, 1320 HR

MISSION NUMBER 11, TOT 1530 HR, AIRCRAFT TYPE A-10

FLIGHT ABORTED--NO FLIGHT LEAD FOUND

TAIL	PILOT	WSO	TAKEOFF	LANDING	COMMENT
203					1320--ABORT, FLIGHT ABORTED
207					1320--ABORT, FLIGHT ABORTED

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MISSION REPORT FOR WARTHOG     FLIGHT ON DAY  1, 1450 HR

   MISSION NUMBER  12, TOT 1700 HR, AIRCRAFT TYPE A-10

   FLIGHT ABORTED--NO FLIGHT LEAD FOUND

   TAIL    PILOT    WSO    TAKEOFF    LANDING          COMMENT
    207                                          1450--ABORT, FLIGHT ABORTED
    208                                          1450--ABORT, FLIGHT ABORTED


MISSION REPORT FOR SQUEAL      FLIGHT ON DAY  1, 1718 HR

   MISSION NUMBER   8, TOT 1230 HR, AIRCRAFT TYPE A-10

   FLIGHT COMPLETED

   TAIL    PILOT    WSO    TAKEOFF    LANDING          COMMENT
    206     117              1135       1718
    202*    104                                      1135--ABORT, FLIGHT LEAD SYSTEM FAILURE


MISSION REPORT FOR OINK        FLIGHT ON DAY  1, 1721 HR

   MISSION NUMBER   8, TOT 1230 HR, AIRCRAFT TYPE A-10

   FLIGHT COMPLETED

   TAIL    PILOT    WSO    TAKEOFF    LANDING          COMMENT
    209*    105              1135       1721
    210     114                                      1135--ABORT, PLANE SYSTEM FAILURE


MISSION REPORT FOR SHOAT       FLIGHT ON DAY  1, 1806 HR

   MISSION NUMBER  12, TOT 1700 HR, AIRCRAFT TYPE A-10

   FLIGHT COMPLETED

   TAIL    PILOT    WSO    TAKEOFF    LANDING          COMMENT
    202*    106              1620       1806
    203     114              1620       1806
```

NOTE: Mission Report for Day 2 is not included in this manual.

TESTRUN AIR BASE ATTACK AT 1300

DAY 1

FLANE TRACE REPORT

F-4	PARKED: READY	PARKED: BEING SERVICED	PARKED: AWAITING SERVICE	STATUS: IN MAINTENANCE	STATUS: AWAITING MAINTENANCE	LOCATION: TAXIING	LOCATION: AIRBORNE	LOCATION: DIVERTED	LOCATION: ATTRITTED
PLANE 401			0000						
		0000							
	0025								
						0540			
							0546		
						0747			
			0753						
		0803							
	0828								
						1140			
							1146		
								1346	
								1421	
PLANE 402			0000						
		0000							
	0025								
						0540			
							0546		
									0746
PLANE 403			0000						
		0000							
	0025								
						0540			
							0546		
						0747			
			0753						
		0803							
	0828								
						1140			
							1146		
									1346
PLANE 404			0000						
		0000							
	0025								
						0540			
							0546		
						0747			
			0753						
		0803							
	0828								
						1140			
							1146		
								1346	

TESTRUN AIR BASE ATTACK AT 1300

DAY 1

F L A N E T R A C E R E P O R T

F-4	<----------PARKED STATUS----------> READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	<----------LOCATION----------> TAXIING	AIRBORNE	DIVERTED	ATTRITTED
								1421	
PLANE 405			0000						
		0000							
	0025								
						0540			
							0546		
						0747			
			0753						
		0803							
	0828								
						1140			
							1146		
								1346	
								1421	
PLANE 40E			0000						
		0000							
	0025								
						0540			
							0546		
						0747			
					0753				
				0808					
					1240				
					1320				
					1320				
				2235					

TESTRUN AIR BASE ATTACK AT 1300

DAY 1

P L A N E T R A C E R E P O R T

A-10	<-----PARKED STATUS-----> READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	<-----LOCATION-----> TAXIING	AIRBORNE	DIVERTED	ATTRITED
PLANE 201			0000						
		0025							
	0040								
						0350			
							0400		
						0541			
			0556						
		0606							
	0621								
						0820			
							0835		
						1016			
					1031				
				1046					
					1240				
					1320				
				1410					
			1453						
		1453							
	1508								
PLANE 202			0000						
		0025							
	0040								
						0350			
							0400		
						0541			
			0556						
		0606							
	0621								
					0820				
				0835					
		0954							
	1004								
						1120			
					1150				
				1205					
					1240				
					1323				
				1350					
		1410							
	1420								
						1501			
							1620		
						1405			
			1812						

TESTRUN AIR BASE ATTACK AT 1300

DAY 1

PLANE TRACE REPORT

A-10	<-----PARKED STATUS-----> READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	<-----LOCATION-----> TAXIING	AIRBORNE	DIVERTED	ATTRITTED
	1837	1822							
PLANE 203			0000						
	0040	0025							
						0350	0400		
						0541			
			0556						
	0621	0606							
						0820	0835		
						1016			
			1031						
	1056	1041							
						1550	1620		
						1806			
			1816						
	1841	1826							
PLANE 204			0000						
	0040	0025							
						0350	0400		
						0541			
			0556						
	0621	0606							
						0820	0835		
						1016			
					1026				
				1041					
			1151						
	1206	1151							
						1240			
							1400		
								1441	

TESTRUN AIR BASE ATTACK AT 1300

DAY 1

P L A N E T R A C E R E P O R T

A-10	<-----PARKED STATUS-----> READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	<-----LOCATION-----> TAXIING	AIRBORNE	DIVERTED	ATTRITTED
PLANE 205	0040	0025	0000			0520	0530		0710
PLANE 206	0040 1008 1833	0025 0958 1818	0000 1748	0555	0540	0520 1120 1718	1135	1315	

NOTE: Plane Trace Report for Day 2 is not included in this report.

TESTRUN AIR BASE ATTACK AT 1300

DAY 1 — C R E W M E M B E R T R A C E R E P O R T

	RESTING	AVAILABLE	BRIEFING	FLYING	DEBRIEFING	ATTRITTED
CREW 301, F-4						
FLIGHT LEAD		0000				
			0440			
				0546		
					0747	
		0823				
			1040			
				1146		
CREW 302, F-4						
WSO		0000				
			0440			
				0546		
					0747	
		0823				
			1040			
				1146		
CREW 303, F-4						
FLIGHT LEAD ATTRITTED		0000				
			0440			
				0546		
					0747	
		0823				
			1040			
				1150		
						1421
CREW 304, F-4						
WSO ATTRITTED		0000				
			0440			
				0546		
						0746
CREW 305, F-4						
FLIGHT LEAD		0000				
			0440			
				0546		
					0747	
		0823				
	1640					
		2023				
CREW 306, F-4						
WSO ATTRITTED		0000				
			0440			
				0546		
					0747	
		0823				
			1040			
				1150		
						1421
CREW 315, F-4						
PILOT ATTRITTED		0000				
			0440			
				0546		
						0746
CREW 316, F-4						
WSO		0000				
			0440			
				0555		
					0756	
		0836				
	1640					
		2036				

TESTRUN AIR BASE ATTACK AT 1300

DAY 1 — C R E W M E M B E R T R A C E R E P O R T

	RESTING	AVAILABLE	BRIEFING	FLYING	DEBRIEFING	ATTRITTED
CREW 317, F-4						
PILOT		0000				
			0440			
				0545		
					0747	
		0823				
			1040			
				1150		
CREW 318, F-4						
WSO ATTRITTED		0000				
			0440			
				0555		
						0755
CREW 319, F-4						
PILOT		0000				
			0440			
				0546		
					0747	
		0823				
			1240			
				1255		
CREW 320, F-4						
WSO		0000				
			0440			
				0555		
					0756	
		0836				
	1640					
		2036				
CREW 321, F-4						
PILOT ATTRITTED		0000				
			0440			
				0555		
						0755
CREW 101, A-10						
FLIGHT LEAD		0000				
			0250			
				0400		
					0541	
		0626				
			0720			
				0835		
					1016	
		1101				
	1450					
		2301				
CREW 102, A-10						
FLIGHT LEAD		0000				
			0250			
				0400		
					0541	
		0626				
			0850			
				1005		
					1146	
		1231				
	1450					

TESTRUN AIR BASE ATTACK AT 1300

DAY 1 CREW MEMBER TRACE REPORT

	RESTING	AVAILABLE	BRIEFING	FLYING	DEBRIEFING	ATTRITTED
CREW 103, A-10						
FLIGHT LEAD ATTRITTED		0000				
			0420			
				0530		
						0710
CREW 104, A-10						
FLIGHT LEAD		0000				
			0420			
				0530		
					0711	
		0756				
			1020			
				1135		
					1718	
		1818				
CREW 105, A-10						
FLIGHT LEAD		0000				
			0550			
				0700		
					0841	
		0926				
			1020			
				1135		
					1721	
	1806					
CREW 106, A-10						
FLIGHT LEAD		0000				
			0550			
				0700		
					0841	
		0926				
			1150			
		1335				
			1450			
				1620		
					1806	
	1846					
CREW 107, A-10						
FLIGHT LEAD ATTRITTED		0000				
			0720			
				0835		
					1016	
		1101				
						1320
CREW 108, A-10						
PILOT		0000				
			0250			
				0400		
					0541	
		0626				
			1150			
		1335				
	1450					
CREW 109, A-10						
PILOT		0000				
			0250			
				0400		
					0541	

.ESTRUN AIR BASE ATTACK AT 1300

DAY 1 — C R E W M E M B E R T R A C E R E P O R T

	RESTING	AVAILABLE	BRIEFING	FLYING	DEBRIEFING	ATTRITTED
		0626				
			1150			
		1335				
	1450					
CREW 110, A-10						
PILOT		0000				
			0420			
				0530		
		0710				
			1240			
				1255		
CREW 111, A-10						
PILOT		0000				
			0420			
				0530		
					0711	
		0756				
	1620					
		1956				
CREW 112, A-10						
PILOT		0000				
			0550			
				0700		
					0841	
		0926				
	1750					
		2126				

NOTE: Crew Member Trace Report for Day 2 is not included in this manual.

TESTRUN AIR BASE ATTACK AT 1300

A I R C R E W S U M M A R Y

CREW NUMBER	HOURS WORKED	HOURS FLYING	HOURS RESTING
301	33.6	27.7	14.4
302	33.6	27.7	14.4
303	ATTRITTED		
304	ATTRITTED		
305	3.7	2.0	44.3
306	ATTRITTED		
307	3.9	2.0	44.1
308	33.5	27.7	14.5
309	3.9	2.0	44.1
310	33.5	26.5	14.5
311	4.4	2.5	43.6
312	3.7	2.0	44.3
313	27.3	25.6	20.7
314	3.9	2.0	44.1
315	ATTRITTED		
316	3.9	2.0	44.1
317	33.5	27.7	14.5
318	ATTRITTED		
319	33.5	26.5	14.5
320	3.9	2.0	44.1
321	ATTRITTED		
322	4.4	2.5	43.6
323	3.9	2.0	44.1
324	4.4	2.5	43.6
325	4.4	2.5	43.6
326	27.3	25.6	20.7
327	ATTRITTED		
328	ATTRITTED		
329	27.6	25.7	20.4
330	27.6	25.7	20.4
101	20.9	8.6	27.1
102	22.4	7.0	25.6
103	ATTRITTED		
104	21.5	13.1	26.5
105	ATTRITTED		
106	ATTRITTED		
107	ATTRITTED		
108	10.7	1.7	37.3
109	10.7	1.7	37.3
110	33.9	24.5	14.1
111	16.3	6.9	31.7
112	14.8	5.2	33.2
113	11.3	7.4	36.7
114	11.4	1.8	36.6
115	ATTRITTED		
116	11.2	7.4	36.8
117	11.7	7.4	36.3
118	11.5	7.5	36.5

TESTRUN AIR BASE ATTACK AT 1300

PLANE LOCATION REPORT

			<----------PARKED STATUS---------->					<----------LOCATION---------->				
DY	TIME	AIRCRAFT	READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	TAXIING	AIRBORNE	DIVERTED	ATTRITED	TOTAL
1	0000	F-4	0	10	2	0	0	0	0	0	0	12
		A-10	0	0	12	0	0	0	0	0	0	12
1	0030	F-4	10	2	0	0	0	0	0	0	0	12
		A-10	0	8	4	0	0	0	0	0	0	12
1	0100	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0130	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0200	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0230	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0300	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0330	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	12	0	0	0	0	0	0	0	0	12
1	0400	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	8	0	0	0	0	0	4	0	0	12
1	0430	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	8	0	0	0	0	0	4	0	0	12
1	0500	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	8	0	0	0	0	0	4	0	0	12
1	0530	F-4	12	0	0	0	0	0	0	0	0	12
		A-10	4	0	0	0	0	1	7	0	0	12
1	0600	F-4	2	0	0	0	0	1	9	0	0	12
		A-10	4	0	4	1	0	0	3	0	0	12
1	0630	F-4	0	0	0	1	0	2	9	0	0	12
		A-10	8	0	0	1	0	0	3	0	0	12
1	0700	F-4	0	0	0	1	0	0	11	0	0	12
		A-10	4	0	0	1	0	0	7	0	0	12
1	0730	F-4	0	0	0	1	0	0	11	0	0	12

TESTRUN AIR BASE ATTACK AT 1300

PLANE LOCATION REPORT

			<----------PARKED STATUS---------->					<----------LOCATION---------->				
DY	TIME	AIRCRAFT	READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	TAXIING	AIRBORNE	DIVERTED	ATTRITED	TOTAL
		A-10	4	0	2	1	0	0	4	0	1	12
1	0800	F-4	0	0	4	1	1	2	2	0	2	12
		A-10	6	0	0	1	0	0	4	0	1	12
1	0830	F-4	4	2	0	2	0	0	2	0	2	12
		A-10	2	0	0	1	1	3	4	0	1	12
1	0900	F-4	6	0	0	2	0	0	2	0	2	12
		A-10	2	0	4	2	0	0	3	0	1	12
1	0930	F-4	6	0	1	2	1	0	0	0	2	12
		A-10	6	0	0	2	0	0	3	0	1	12
1	1000	F-4	7	0	0	3	0	0	0	0	2	12
		A-10	4	2	0	0	0	2	3	0	1	12
1	1030	F-4	7	0	0	3	0	0	0	0	2	12
		A-10	6	0	0	0	1	2	2	0	1	12
1	1100	F-4	7	0	0	3	0	0	0	0	2	12
		A-10	7	0	0	2	0	0	2	0	1	12
1	1130	F-4	7	0	0	3	0	0	0	0	2	12
		A-10	3	0	0	2	0	4	2	0	1	12
1	1200	F-4	1	0	0	3	0	0	6	0	2	12
		A-10	3	1	1	1	2	1	2	0	1	12
1	1230	F-4	1	0	0	3	0	0	6	0	2	12
		A-10	6	0	0	2	1	0	2	0	1	12
1	1300	F-4	0	0	0	0	3	0	7	0	2	12
		A-10	5	0	0	0	3	0	3	0	1	12
1	1330	F-4	0	0	0	0	3	0	6	1	2	12
		A-10	5	0	0	0	3	0	0	3	1	12
1	1400	F-4	0	0	0	0	3	0	0	6	3	12
		A-10	5	0	0	1	2	0	0	3	1	12
1	1430	F-4	0	0	0	0	3	0	0	5	4	12
		A-10	6	0	0	1	1	0	0	3	1	12
1	1500	F-4	0	0	0	0	3	0	0	5	4	12
		A-10	6	1	0	1	0	0	0	3	1	12

TESTRUN AIR BASE ATTACK AT 1300

PLANE LOCATION REPORT

			<----------PARKED STATUS---------->					<----------LOCATION---------->				
DY	TIME	AIRCRAFT	READY	BEING SERVICED	AWAITING SERVICE	IN MAINTENANCE	AWAITING MAINTENANCE	TAXIING	AIRBORNE	DIVERTED	ATTRITTED	TOTAL
1	1530	F-4	0	0	0	0	3	0	0	5	-	12
		A-10	7	0	0	1	0	0	0	3	1	12
1	1600	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	6	0	0	0	0	2	0	3	1	12
1	1630	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	6	0	0	0	0	0	2	3	1	12
1	1700	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	6	0	0	0	0	0	2	3	1	12
1	1730	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	6	0	0	0	0	2	2	1	1	12
1	1800	F-4	0	0	0	1	2	0	0	5	-	12
		A-10	6	1	1	0	0	0	2	1	1	12
1	1830	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	7	3	0	0	0	0	0	1	1	12
1	1900	F-4	0	0	0	1	2	0	0	5	-	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	1930	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2000	F-4	0	0	0	1	2	0	0	5	-	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2030	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2100	F-4	0	0	0	1	2	0	0	5	-	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2130	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2200	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2230	F-4	0	0	0	1	2	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	1	12
1	2300	F-4	1	0	0	1	1	0	0	5	4	12
		A-10	10	0	0	0	0	0	0	1	0	11

NOTE: Plane Location Report for Day 2 is not included in this manual.

TESTRUN AIR BASE ATTACK AT 1300

AIRBASE UNDER ATTACK AT DAY 1, 1300 HR

DAY 1, 1300 HR

R U N W A Y S T A T U S R E P O R T

RUNWAY NO	CLEAR LENGTH (IN FEET)	CLEAR WIDTH (IN FEET)	CLASS	DESIGNATION	NAVAIDS
1	8000	150	CONCRETE	ACTIVE	YES
2	8000	150	CONCRETE	ACTIVE	YES

NO TAXIING PLANES

DAY 1, 1300 HR

M A I N T E N A N C E U N I T S S T A T U S R E P O R T

JNIT NO	LOCATED AT PARKING SPACE NO	TYPE OF PARKING SPACE
1	UNASSIGNED	
2	UNASSIGNED	
3	UNASSIGNED	
4	UNASSIGNED	
5	UNASSIGNED	

DAY 1, 1300 HR

S E R V I C E U N I T S S T A T U S R E P O R T

UNIT NO	LOCATED AT PARKING SPACE NO	TYPE OF PARKING SPACE
1	UNASSIGNED	
2	UNASSIGNED	
3	UNASSIGNED	
4	UNASSIGNED	
5	UNASSIGNED	
6	UNASSIGNED	
7	UNASSIGNED	
8	UNASSIGNED	
9	UNASSIGNED	
10	UNASSIGNED	

DAY 1, 1300 HR

CREW MEMBERS STATUS REPORT

QUALIFIED AIRCRAFT TYPE	CREW TYPE	CREW NUMBER	CURRENT STATUS
F-4	FLIGHT LEAD PILOT	305	AVAILABLE
F-4	FLIGHT LEAD PILOT	307	AVAILABLE
F-4	FLIGHT LEAD PILOT	309	AVAILABLE
F-4	FLIGHT LEAD PILOT	311	AVAILABLE
F-4	NON-FLIGHT LEAD PILOT	323	AVAILABLE
F-4	NON-FLIGHT LEAD PILOT	325	AVAILABLE
F-4	NON-PILOT	312	AVAILABLE
F-4	NON-PILOT	314	AVAILABLE
F-4	NON-PILOT	316	AVAILABLE
F-4	NON-PILOT	320	AVAILABLE
F-4	NON-PILOT	322	AVAILABLE
F-4	NON-PILOT	324	AVAILABLE
A-10	FLIGHT LEAD PILOT	101	AVAILABLE
A-10	FLIGHT LEAD PILOT	102	AVAILABLE
A-10	FLIGHT LEAD PILOT	106	BRIEFING
A-10	FLIGHT LEAD PILOT	107	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	108	BRIEFING
A-10	NON-FLIGHT LEAD PILOT	109	BRIEFING
A-10	NON-FLIGHT LEAD PILOT	111	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	112	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	113	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	114	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	115	AVAILABLE
A-10	NON-FLIGHT LEAD PILOT	116	AVAILABLE

DAY 1, 1300 HR

PARKING SPACE STATUS REPORT

SPOT NO	TYPE	---MINUTES TO ACCESS--- FUEL	ORD	MAINT	RUNWAY	TAIL NO	AIRCRAFT TYPE	SERVICED YES/NO	STATUS
601	SHLT	10	10	15	6	407	F-4	YES	AWAITING MAINTENANCE
602	SHLT	10	10	15	6	208	A-10	YES	READY TO GO
603	SHLT	10	10	15	6	412	F-4	NO	AWAITING MAINTENANCE
604	SHLT	10	10	15	6	EMPTY			
605	SHLT	10	10	15	6	EMPTY			
606	SHLT	10	10	15	6	406	F-4	NO	AWAITING MAINTENANCE
607	REVT	10	10	15	10	EMPTY			
608	REVT	10	10	15	10	EMPTY			
701	SHLT	10	10	15	15	202	A-10	YES	AWAITING MAINTENANCE
702	SHLT	10	10	15	15	210	A-10	YES	AWAITING MAINTENANCE
703	SHLT	10	10	15	15	207	A-10	YES	READY TO GO
704	SHLT	10	10	15	15	211	A-10	YES	READY TO GO
705	SHLT	10	10	15	15	201	A-10	NO	AWAITING MAINTENANCE
706	SHLT	10	10	15	15	203	A-10	YES	READY TO GO
707	REVT	10	10	15	10	EMPTY			
708	REVT	10	10	15	10	212	A-10	YES	READY TO GO
800	OPEN	10	10	15	10	EMPTY			
900	HNGR	10	10	15	10	EMPTY			

TESTRUN AIR BASE ATTACK AT 1300

AIRCRAFT

DAILY SUMMARY REPORT

	AIRCRAFT TYPE	AIRCRAFT NUMBER	SORTIE SCHD	SORTIE FLOWN	SORTIE CANCELLED OPS	SORTIE CANCELLED MX	SORTIE ABORTED MX	SORTIE ABORTED SYM	AIRCRAFT ATTRITTED	AIRCRAFT DAMAGED	SORTIE RATE	ATTRITION RATE	DAMAGE RATE
DAY 1	F-4	12	18	17	0	0	1	0	4	2	1.51	.24	.12
	A-10	12	36	20	9	3	4	0	1	0	1.70	.05	+0+0
	THERE WERE 2 FLUSHED SORTIES												
DAY 2	F-4	8	18	0	0	18	0	0	0	0	+0+0	I	I
	A-10	11	36	19	0	17	0	0	3	4	1.85	.16	.21

REFERENCES

SIMSCRIPT II.5 Reference Handbook, C.A.C.I., Inc.
Los Angeles, CA, March 1976, UNCLASSIFIED

SIMSCRIPT II.5 User Information Manual,
Control Data Corporation and CACI Inc. - Federal,
1977, 1978, UNCLASSIFIED

Kleine, Henry. Software Design and Documentation Language,
JPL Publication 77-24, Revision 1, Jet Propulsion Laboratory,
Pasadena, CA, August 1979, UNCLASSIFIED

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AD-A102 461

Final Report

method to [illegible] sorties. The model was [illegible] generate so that in accordance [illegible] basing order and second, to depict [illegible] generation. The PHOENIX model [illegible] applying crews and planes to [illegible] accurate event simulation of the

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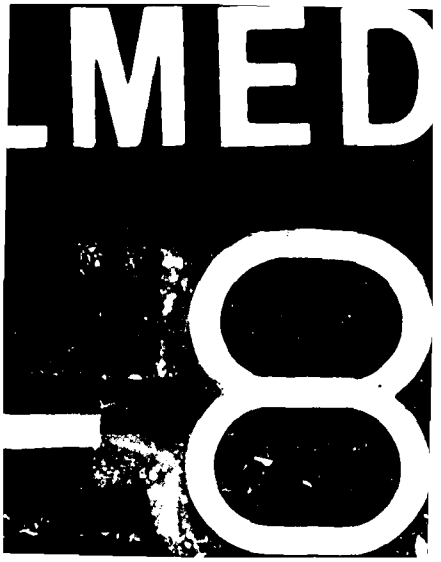
activities on an air base. It was patterned after air bases located in Europe, but the generic design does not preclude its use for simulating any base. The model is written in Simscript II.5 structured programming language with all data values set by the user. The current version of the model executes on the Cyber 74 at Nellis AFB, NV.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